



MII Broadcast Systems

Panasonic
Broadcast Systems

MAINTENANCE HAND BOOK

**STUDIO
VTR
AU-650B**

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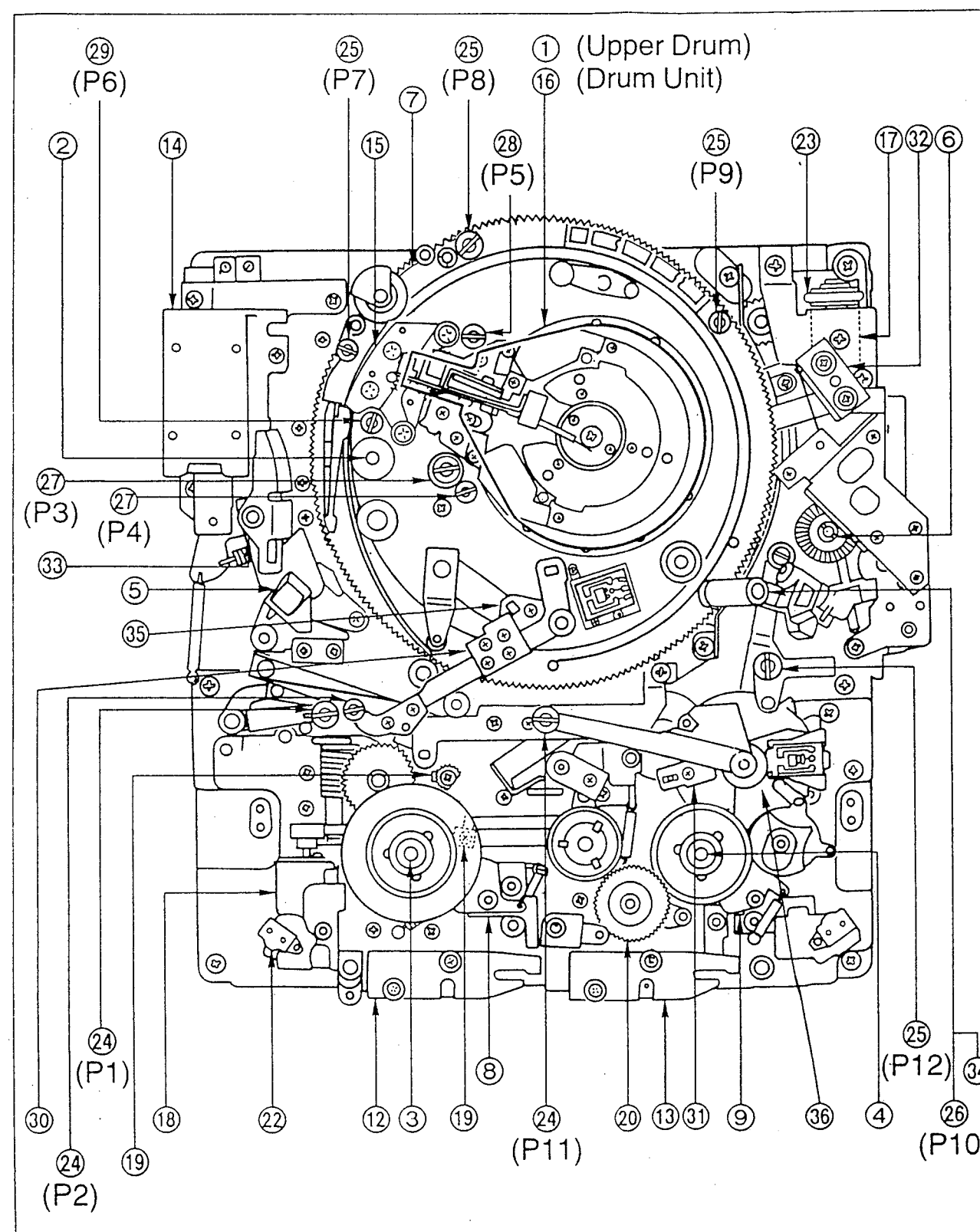
Maintenance Chart

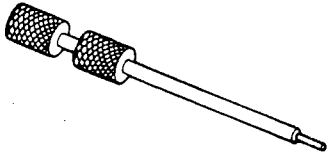
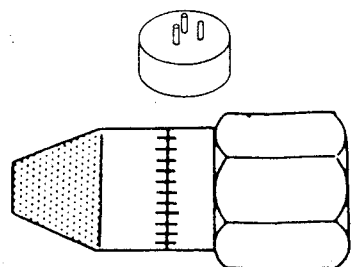
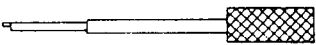
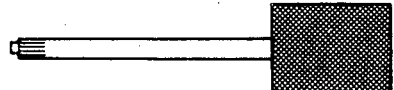
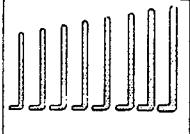
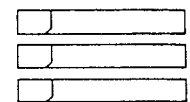
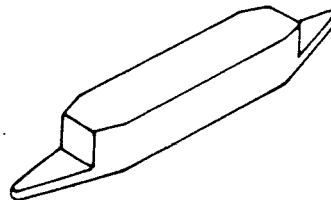
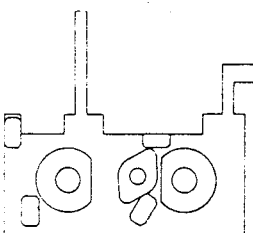
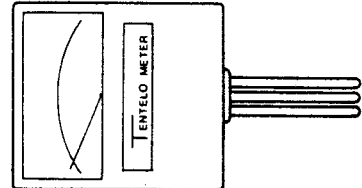
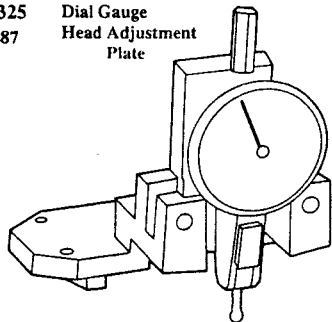
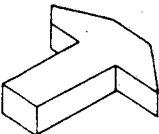


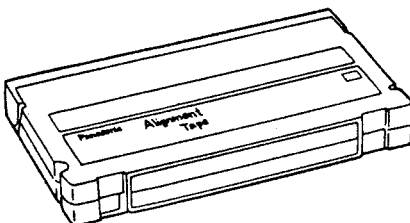
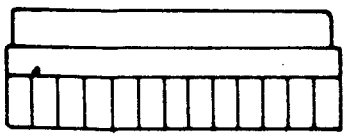
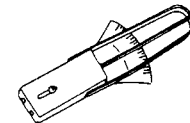
◎: for M.A.R.C. (CART) ●: Replacement

Part Name	Part No.	Pcs/ Unit	Location No.	Using Hours							
				5 0 0	1 0 0 0	1 5 0 0	2 0 0 0	2 5 0 0	3 0 0 0	3 5 0 0	4 0 0 0
Upper Drum	VEH0383	1	1	●	●	●		●	●	●	
Capstan Unit	VEM0297	1	2				●				●
Supply Reel Motor	VRD0031	1	3				●				●
Take up Reel Motor	VRD0032	1	4				●				●
Full Erase Head	VBS0040	1	5				●				●
TR Encoder Unit	*VXP0656	1	6				●				●
TR Bearing	VDB0778	2	6				●				●
Pinch Roller Arm Unit	VXL1288	1	7	●			●		●		●
Supply Main Brake Unit	VXL1280	1	8				●				●
Take up Main Brake Unit	VXL1475	1	9				●				●
Supply Brake Solenoid	VSJ0091	1	12								●
Take up Brake Solenoid	VSJ0091	1	13								●
Pinch Solenoid	VSJ0069	1	14				●				●
A/C Head	VED0078	1	15				●				●
Drum Unit with Brush Unit & SLIP RING	VEC0601	1	16				●				●
Loading Motor	VRD0030	1	17								●
Loading Motor (small)	VEM0264	1	18								●
Leaf Switch	VSH0026	2	19								●
Intermediate Gear	VXP0757	1	20								●
Detector Base L Unit	VES0479	1	22								●
Loading Motor Belt	VDV0156	1	23	●			●		●		●
Post Roller with Bearing	P1, P2, P11	VXP0820	3				●				●
	P7, P8, P9, P12	VXP0821	4				●				●
	P10	VXP0822	1				●				●
	P3, P4	VXP0823	2				●				●
	P5	VXP0824	1				●				●
	P6	VXP0819	1				●				●
Lower Frange	VMS2803	1	25								●
S. Tension Spring Plate	VMC0119	1	30						●		
S. Stopper Pin Base Unit	VXA2302	1	35						●		
T. Stopper Pin Base Unit	VXA2306	1	31						●		
T. Tension unit Base	VXA2303	1	36						●		
Sub Loading Switch	VSM0042	1	32								●
Pinch Press Lever	VXL1285	1	33					◎			●
IP Base Unit (W/ P10 Post)	VXR0131	1	34								●
Fan Motor	VRF0037	2	----				●				●
Power Box Fan Motor	VRF0052	1	----				●				●
Eject Switch	VSP0221	1	----						●		
Carriage Illumination Lamp	VLL0019	3	----	●		●		●			●
Front Loading Motor	VEM0228	1	----								●
Front Loading Motor Belt	VDV0157	1	----	●		●		●			●
Loading Switch	VSM0048	2	----					◎			●

* IMPORTANT NOTICE
In order to avoid the tape damage, TR Encoder Unit should be replaced with above listed part accordance with maintenance schedule regularly.

MAINTENANCE PARTS LOCATION



Servicing Fixtures & Tools for Model AU- 650B Tool Kit No. VFK0356C		
VFK0293 	VFK0133 VFK0134 	VFK0357 (φ1.5) VFK0358 (φ2) VFK0359 (φ3) 
VFK0446 Fine Adjustment Screwdriver (3mmφ) 	VFK0326 Hex. Wrench (Set)  VFK27 Head Cleaning Stick 	VFK0363 Post Height Fixture 
VFK0352 Mech Neutral Adjustment Plate 	VFK0132 Back Tension Meter (Tentelometer) 	VFK0325 VFK0287 
VFK0438 P2 Post Tilt Fixture 	VFK0296 RT Gap Spacer  VFK0470 20Pin Extension Cable Set  × 6	VFM7180EG Alignment Tape  <small>This alignment tape is not included in the tool kit.</small>
VFK0361 Dummy Plug (1) For Large Cassette VFK0362 Dummy Plug (2) For Small Cassette 	VFK66 Fan Type Tension Gauge 	

PURPOSE OF MAINTENANCE TOOL	
Part No.	Purpose
VFK0293	Tape Interchangeability Adjustment
VFK0133 • VFK0134	Brake Torque Adjustment
VFK0357	Horizontal Position of A/C Head Tension Adjustment
VFK0358	Timer Roller Position Adjustment Sub Loading Switch Adjustment Pinch Roller Solenoid Adjustment Brake Solenoid Adjustment Position of P1 Post Drive Rod
VFK0359	Brake Solenoid Adjustment Tension Adjustment
VFK0446	Horizontal Position of A/C Head Leaf Switch Adjustment Loading Completion Detect Photo Sensor Position Adjustment Unloading Completion Detect Photo Sensor Position Adjustment Cassette Detect Sensor Adjustment
VFK0326	Reel Motor Adjustment Timer Roller Height Adjustment A/C Head Adjustment Sub Loading Post Adjustment Tape Interchangeability Adjustment Cassette Prop height Adjustment Small Cassette Props Height Adjustment Small Cassette Reel Table Height Adjustment
VFK0363	Tape Interchangeability Adjustment
VFK0352	Reel Motor Adjustment Tape Interchangeability Adjustment P2 Post Tilt Adjustment Cassette Prop Height Adjustment Small Cassette Prop Height Adjustment Small Cassette Reel Table Height Adjustment Take-up Tension Adjustment
VFK0132	Tension Adjustment
VFK0438	P2 Post Tilt Adjustment
VFM7180EG	A/C Head Adjustment Tape Interchangeability Adjustment A/C Head Adjustment
VFK0361, VFK0362	Tension Adjustment
VFK66	Pinch Roller Pressure Adjustment

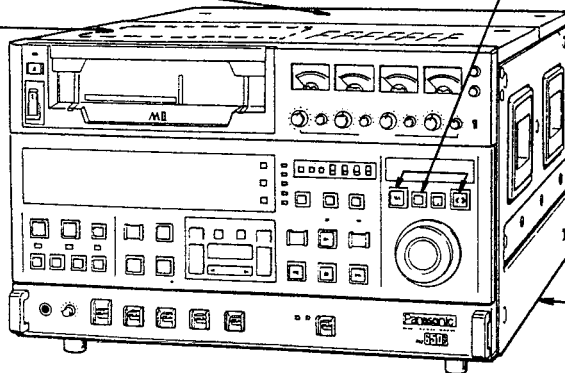
DISASSEMBLY METHOD

TOP PANEL

1. Make sure that the power switch is turned off or power cord is removed before disassembly.
2. Remove 4 screws and remove the top panel.

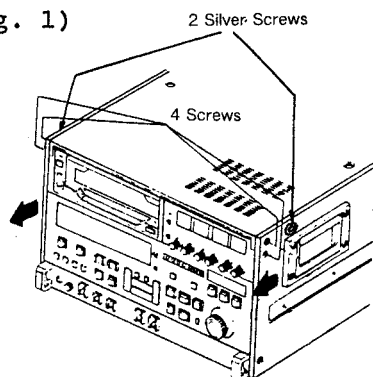
HALF LOADING FOR A/C HEAD CLEANING

If you want to replace or clean the A/C head, please press any two of the three buttons simultaneously.

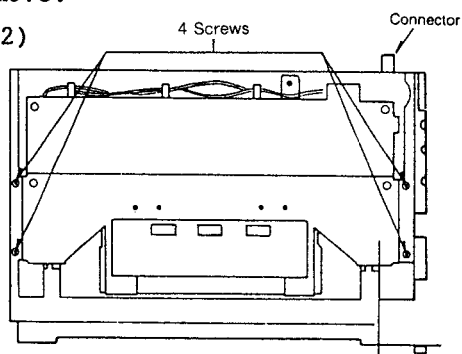


1. Remove the 4 screws and loosen the 2 silver screws then pull the front panel (upper side) forward. (Fig. 1)
2. Remove the 4 screws and remove the carriage fix plate. (Fig. 2)
3. Remove the 2 screws (A) on the chassis. (Fig. 3)
4. Turn the front loading motor by hand until carriage is down position and then remove 2 screws (B) and connector. (Fig. 3)
5. Carefully lift up the carriage and remove.

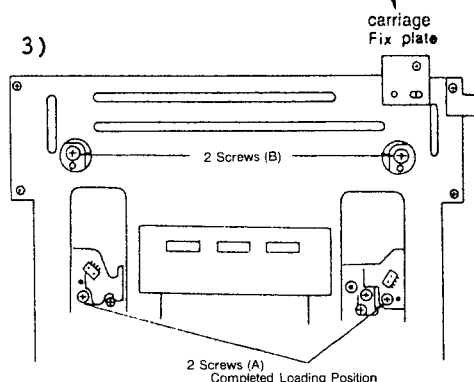
(Fig. 1)



(Fig. 2)

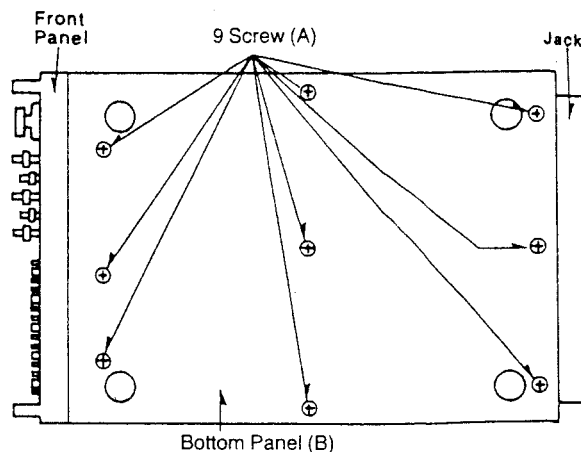


(Fig. 3)



BOTTOM PANEL

1. Unscrew the 9 screws (A) and remove the bottom panel (B).



1. DRUM UNIT REPLACEMENT AND ADJUSTMENT

1-1. DRUM UNIT REPLACEMENT

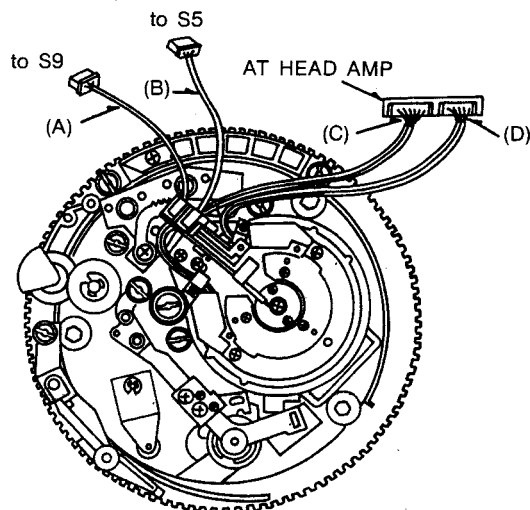
REMOVAL

1. Disconnect the connectors (A), (B), (C) and (D) as shown in figure 1-1.
2. Remove the bottom plate.
3. Disconnect the 2 connectors (E) as shown in figure 1-2.
4. Remove the top cover of the shield case (R/P Head Amp) and disconnect the 2 connectors (F) as shown in figure 1-2.
5. Disconnect the connector (G).
6. Remove the 3 screws (H) and remove the drum assembly from the tape transport side.

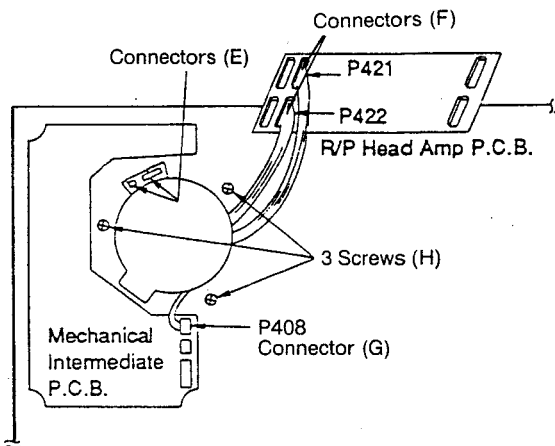
INSTALLATION and CONFIRMATION

1. Install new head drum assembly.
(Do not touch the surface of the head drum where tape contacts)
2. Tighten the 3 screws (H) evenly.
(recommended driver torque --- 8 kg/cm)
3. Reconnect the connectors that were disconnected during the removal.
4. Clean the head drum using alcohol, after cleaning using alcohol, wipe the head using dried cloth.
5. Make a recording for a few minutes and playback the just recorded portion about 2 second.
6. Press the STOP bottom and confirm that the top of envelope is stable.
(less than 2 msec) as shown in figure 1-3.
7. If it is not, confirm that the wires from the drum is not pinched between drum and chassis or confirm that the 3 screws are exactly tightened.

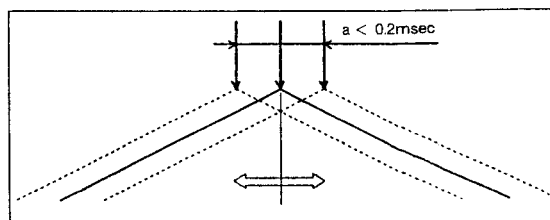
(Fig. 1-1)



(Fig. 1-2)



(Fig. 1-3)



1-2. UPPER DRUM REPLACEMENT

Tools Required:

Head Adjustment Plate (VFK0287)

Dial Gauge (VFK0325)

RT Gap Spacer (VFK0296)

Hex Wrench (1.27mm 2mm 2.5mm)

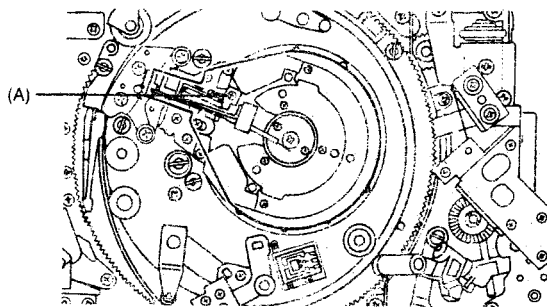
1. Remove the screw (A) and lift off the brush cover (figure 1-4).
2. Remove the screws (B) and (C), then remove the brush unit. (Caution: brushes are easy to bent) (Fig. 1-5)
3. Remove the 2 screws (D) and remove the rotary transformer arm unit (H).
4. Unsolder the 14 lead wires of the slip ring (I) as shown in figure 1-6.
5. Remove the 2 screws (F) and remove the slip ring unit (I).
6. Unsolder the 8 lead wires of the upper drum.
7. Remove the screws (G) (figure 1-7) and remove the upper drum (J).
8. Install the new upper drum so that the wire colours match, and loosely tighten the screws (G).

Note:

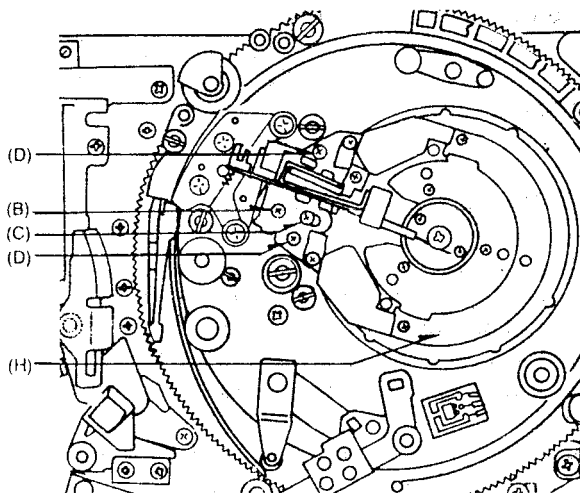
Before install the new upper drum, clean this part using head cleaning stick or soft cloth. (figure 1-8)

9. Install the head adjustment plate in place of the rotary transformer with attached 2 screws.
10. Mount the dial gauge with screw (A) (figure 1-9) so that the pick up of the dial gauge touches the upper part of the rotating drum.
11. Adjust the screw (B) of the head adjusting plate so that the pick up touches the drum and increases 20 to 80um in indication.
12. Rotate the outer ring of the dial gauge to set the meter indication to zero. Rotate the upper drum slowly by hand. If the upper drum is not concentric with its axis of rotation, the meter will swing back and forth, indicating the amount of error. The maximum allowable tolerance is within $\pm 1.5\mu\text{m}$.

(Fig. 1-4)

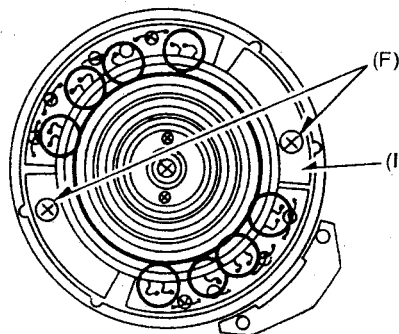


(Fig. 1-5)



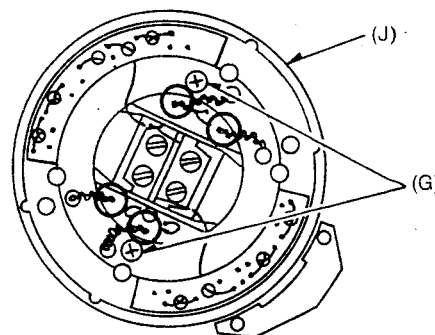
(Fig. 1-6)

○ 14 lead wires



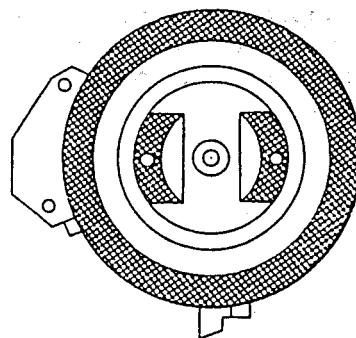
(Fig. 1-7)

○ 8 lead wires

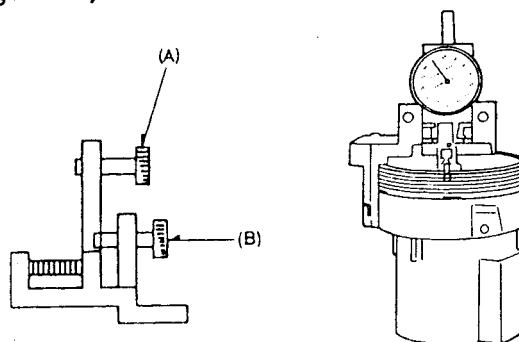


13. If it is out of specification, adjust the position of the upper drum by tapping lightly with the plastic handle of a screwdriver on the side of the drum opposite from the point of measurement. When the eccentricity is within $\pm 1.5\mu\text{m}$, gently tighten the 2 screws (G). Check eccentricity to make sure it is within specification. If it is out, repeat this procedure.
14. Tighten the screws (G) securely and check eccentricity again. If it is within $\pm 1.5\mu\text{m}$, remove the head adjustment plate.
15. Solder the 8 lead wires of the upper drum to their matching colours.
16. Install the slip ring unit (I) and tighten the 2 screws (F) as shown in figure 1-6.
17. Solder the 14 lead wires of the slip ring (I) as shown in figure 1-6.
18. Set the RT gap spacer on the lower part of the rotary transformer and install the upper RT unit (H), with the 2 screws (D). (Fig.1-5)
19. To assure proper spacing of the two halves of the rotary transformer, the 3 hex screws (L) are adjusted (clockwise) so that the upper half of the rotary transformer touches the spacer at all three points. Hex screws (K) should be loose during this procedure. Loosen each screw (L) CCW slightly until the spacer can be pulled free, then keep this gap and tighten the 3 hex screws (K) evenly (Do not tighten up). Check to see that the upper drum turns freely even if using the RT gap spacer. (Fig. 1-10, 1-11)
20. Install the brush unit and tighten the screws (B) and (C). (figure 1-5)
21. Normally brush tension need not be adjusted unless new brushes are installed. However, to check the brush adjustment, first of all, confirm that the brush stopper portion (bending portion of the metal plate) is just touches the RT arm cutting portion as shown in figure 1-12. And loosen the screw (E) until they are straight and still touching the slip ring assembly, then tighten the screw (E) 1 and 1/2 turns clockwise as shown in figure 1-5
22. Install the brush cover and tighten the screw (A).

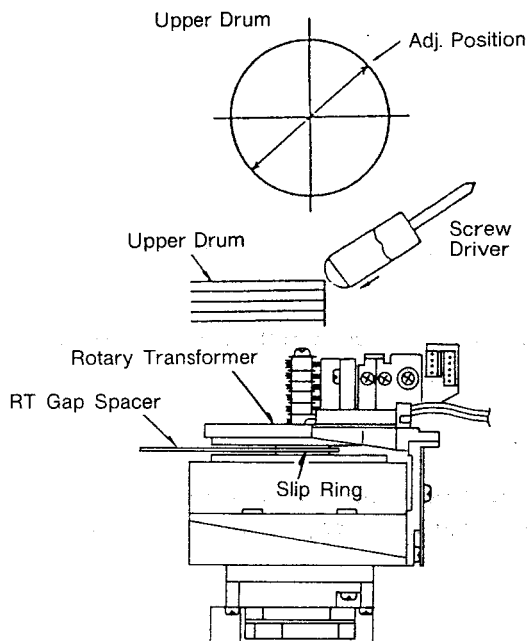
(Fig. 1-8)



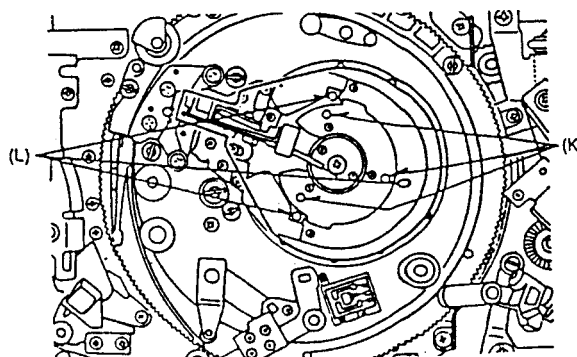
(Fig. 1-9)



(Fig. 1-10)



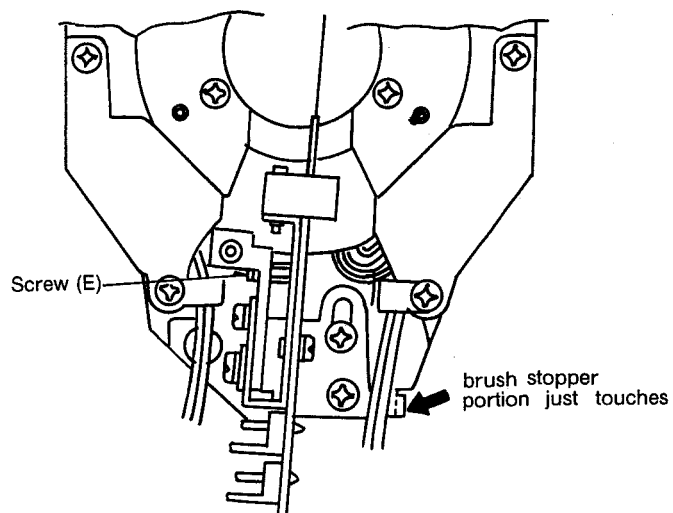
(Fig. 1-11)



Note:

When the upper drum is replaced, run the cleaning cassette (AU-MPSCL) for 60 second to polish the head surface.

Fig. 1-12

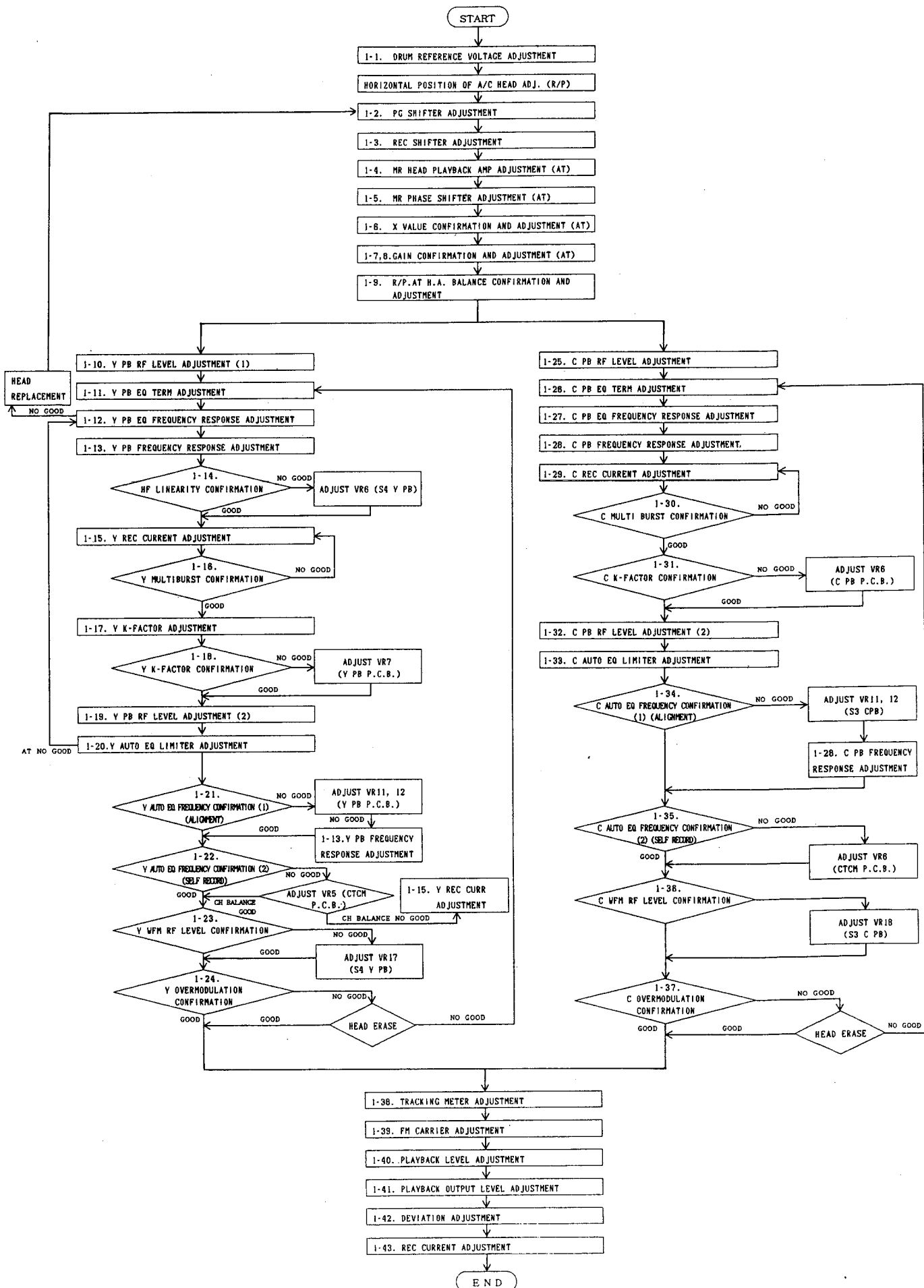


ADJUSTMENT

After the replacement, perform the following electrical adjustments.

Note:

After adjustment of Upper Drum, confirm the C RF envelope output is flat using the alignment tape linearity portion.

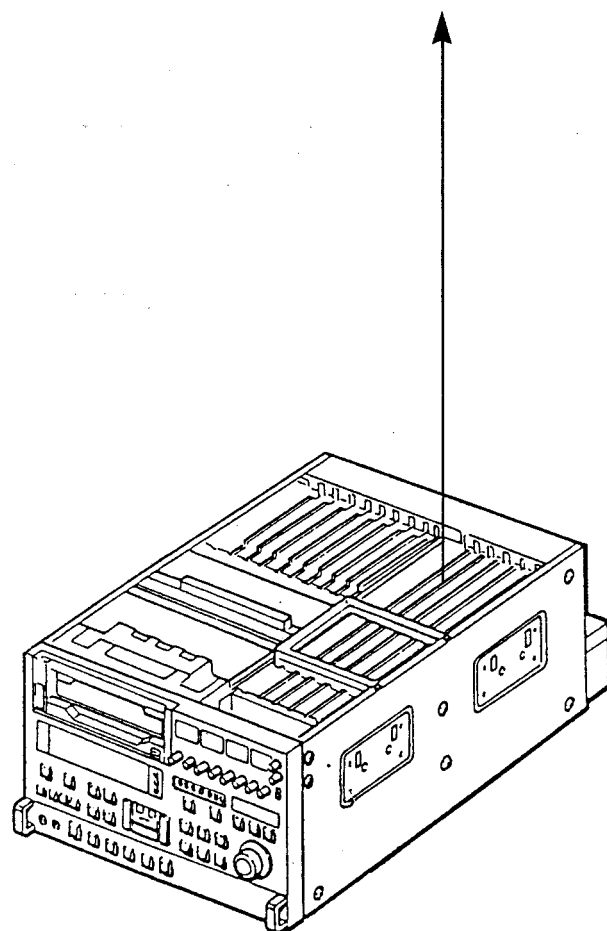
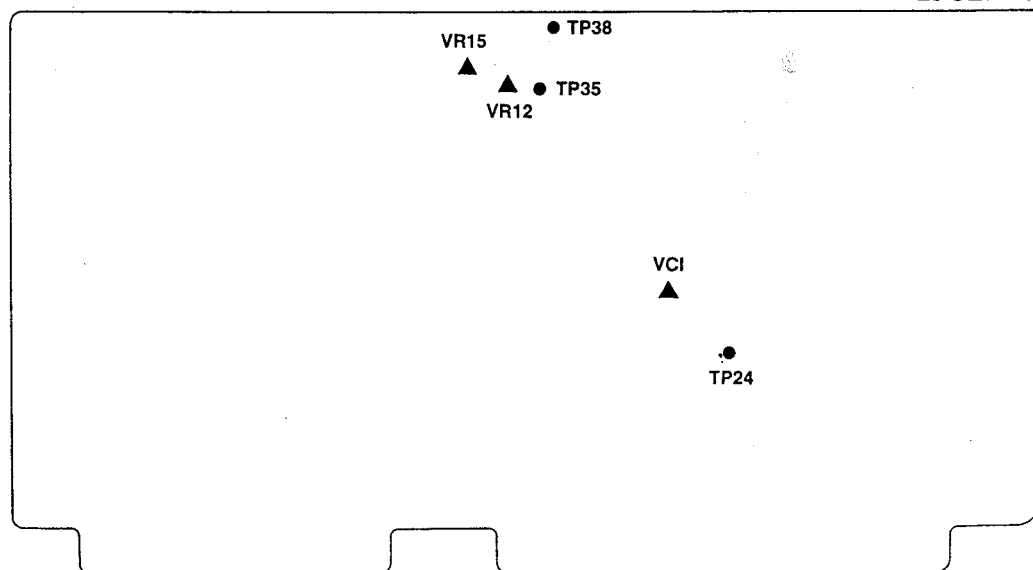


1-1. DRUM REFERENCE VOLTAGE ADJ.

(L5 SERVO)

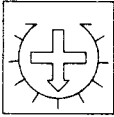
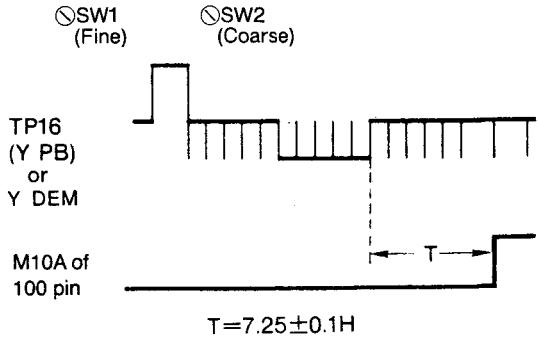
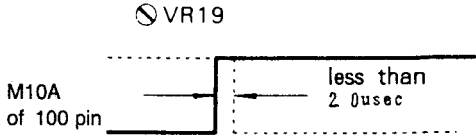
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP38 TP35 TP24	STOP ↓ RECORD	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	D.V.M. FREQUENCY	—	VR12 (-5V ADJ) VR15 (DRUM REF) VC1 (INT 25Hz)
Step 1. MODE : STOP Adjust VR15 (DRUM REF) so that the DC voltage at TP38 is 2.5V (+/- 0.1V DC).					
Step 2. MODE : STOP Adjust VR12 (-5 ADJ) so that the voltage at TP35 is -5.0V (+/- 0.1V DC).					
Step 3. MODE : REC Connect the frequency counter to TP24 and adjust VC1 (INT 25Hz) to 25Hz (+/- 0.001Hz).					

L5 SERVO

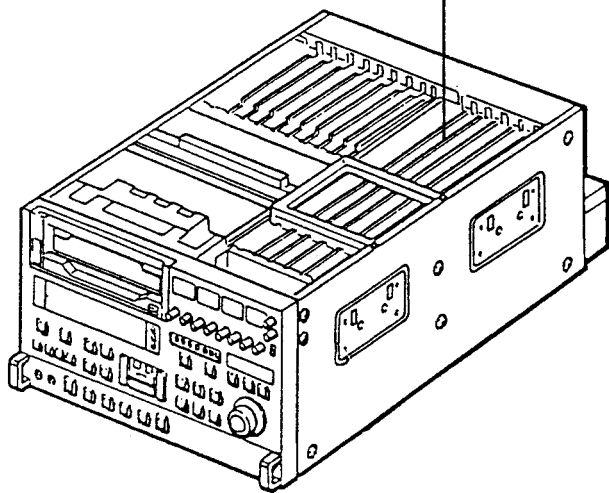
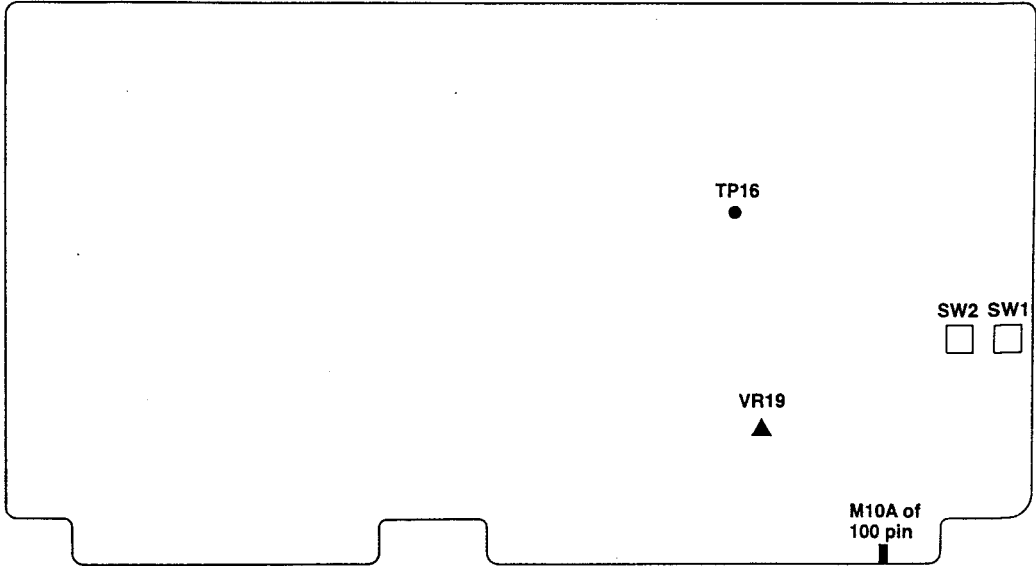


1-2. PG SHIFTER ADJ.

(L5 SERVO)

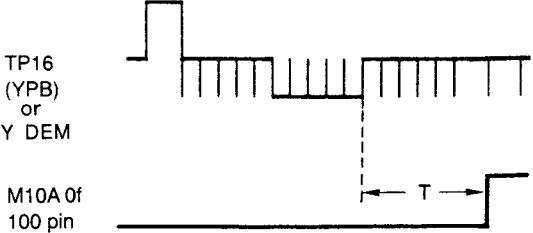
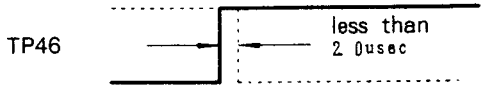
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
M10A of 100pin Connector TP16 (S4) or Y DEM OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR BAR PORTION (0~6min)	OSCILLOSCOPE	—	VR19 (PG -) SW1 SW2
Step 1. MACHINE CONDITION			HEAD SELECT : R/P TRACKING VR : CENTRE DETENT POSITION		
Step 2. Turn VR19 (PG -) to centre position.			 VR19		
Step 3. Adjust SW1 and SW2 so that the rising edge of the switching pulse is 7.25H (+/- 0.1H) as shown figure. Note: SW1 is for Fine adjustment SW2 is for Coarse adjustment					
Adjust VR19 (PG-) so that the difference between the rising and falling edge is less than 2.0 μsec as shown figure. Note: This may be seen by switching the scope trigger from (+) to (-) slope select.					

L5 SERVO



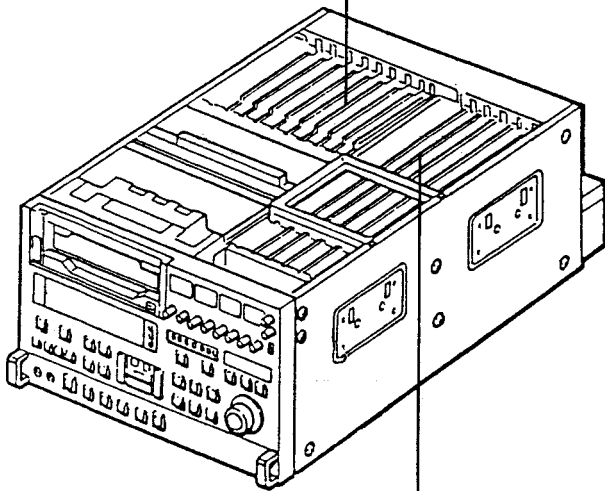
1-3. REC SHIFTER ADJ.

(L5 SERVO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP16 (S4) or Y DEM OUT M10A of 100pin Connector TP46	RECORDING	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	100% COLOUR BAR	VR8 (DUTY SHIFTER) VR9 (REC SHIFTER)
Step 1. MACHINE CONDITION			TAPE/EE : EE HEAD SELECT : R/P		
Step 2. Adjust VR9 (REC SHIFTER) as shown figure.			<div style="text-align: center;"> <p>⊗ VR9</p>  <p>$T = 7.25 \pm 0.1H$</p> </div>		
Step 3. Adjust VR8 (DUTY SHIFTER) so that the difference between the falling and rising edge is less than $2.0 \mu\text{sec}$. Note: This may be seen by switching the scope trigger from (+) to (-) slope select.			<div style="text-align: center;"> <p>⊗ VR8</p>  </div>		

S4 Y PB

TP16



L5 SERVO

TP46

VR8

VR9

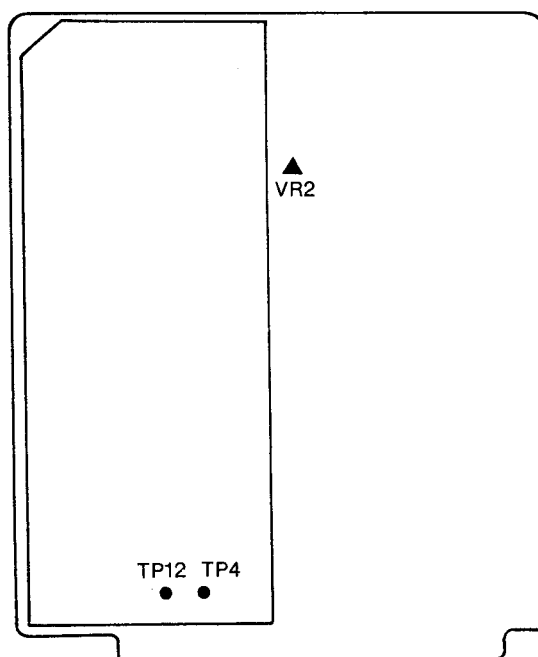
M10A of
100 pin

1-5. MR PHASE SHIFTER ADJUSTMENT

(S9 AT)

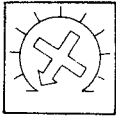
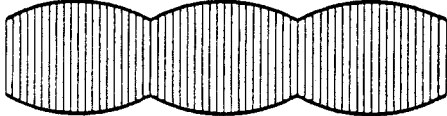
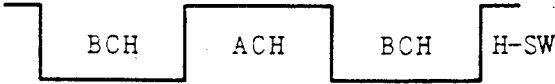
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP 4 TP12	REC	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	D. V. M	COMPONENT COLOUR BAR	VR 2 (MR PHASE SHIFTER)
Step 1. MACHINE CONDITION			TR VR : Centre Detent Position AUTO/PRESET SW : PRESET (S9 AT)		
Step 2. Adjust VR2 (MR PHASE SHIFTER) so that the voltages at TP4 and TP12 become closet to 0V DC.					
Step 3. Confirm that the D26 (FRM LED) on the AT board is not illuminated. If it illuminates, readjust VR2.					
Step 4. After this adjustment, set the tracking AUTO/PRESET switch to AUTO position.					

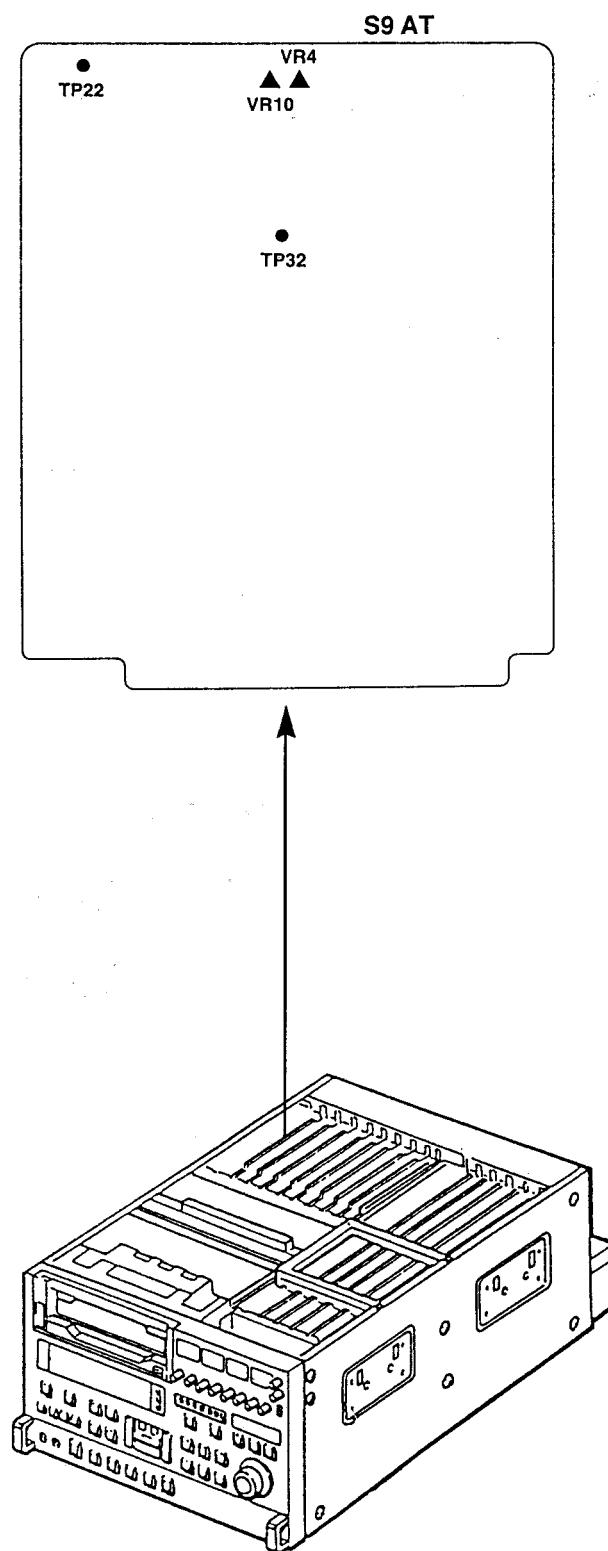
S9 AT



1-6. X VALUE ADJ.

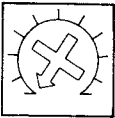
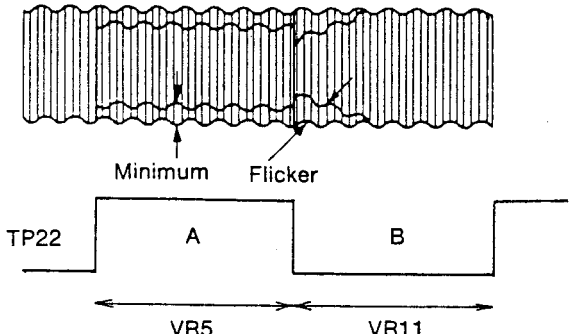
(S9 AT)

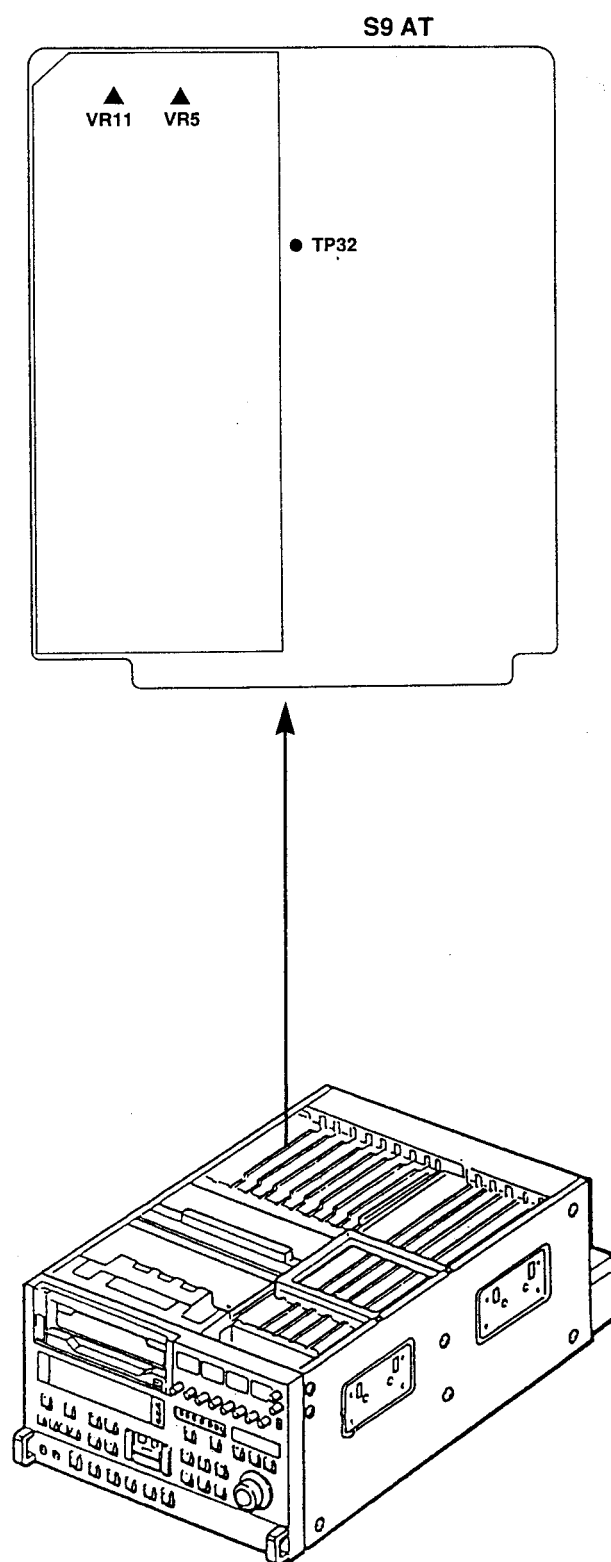
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP32 TP22 for Trigger	Confidence Playback	<div>■ BLANK</div> <div>□ ALIGNMENT</div>	OSCILLOSCOPE	COMPONENT COLOUR BAR	<div>VR4 (AX)</div> <div>VR10 (BX)</div>
Step 1. MACHINE CONDITION			<div>TAPE/EE : TAPE</div> <div>HEAD SELECT : R/P</div> <div>AUTO/PRESET (S9 P.C.B.) : PRESET</div>		
Step 2. Turn VR4 (AX) and VR10 (BX) fully CCW			<div>Fully CCW</div> <div>  </div> <div>VR4, VR10</div>		
Step 3. Slowly turn the VR4 (AX) and VR10 (BX) on the AT P.C.B. CW until the RF envelope is first maximum point as shown figure.			<div>TP32 ⊗ VR4 VR10</div> <div>  </div> <div>TP22</div> <div>  </div>		
Note: This adjustment requires that mechanical interchangeability be correct before proceeding.					



1-7. GAIN ADJ. (1)

(S9 AT)

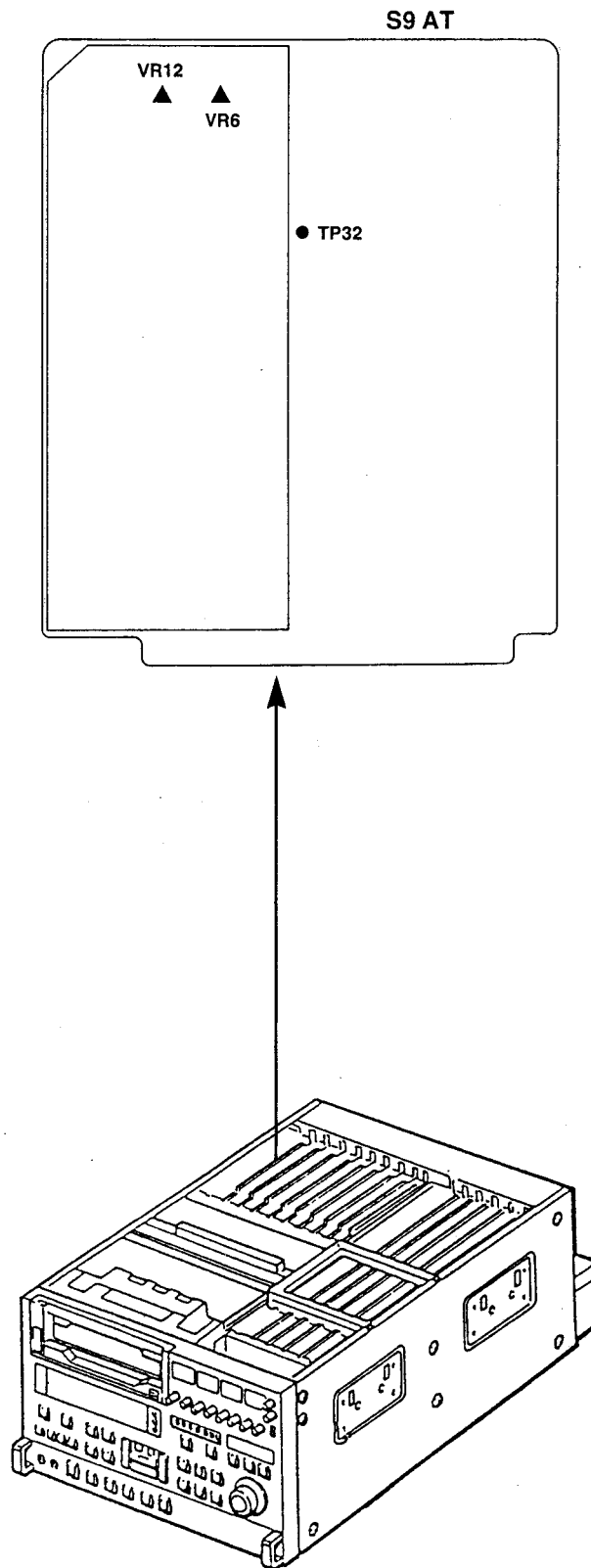
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP32	VAR +30/32	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR PORTION (0 ~ 6min)	OSCILLOSCOPE	—	VR5 (A GAIN) VR11 (B GAIN)
Step 1. MACHINE CONDITION			AUTO/PRESET (S9 P.C.B.) : PRESET		
Step 2. Turn VR6 (A COMP) and VR12 (B COMP) fully CCW.			<div style="text-align: center;"> <p>Fully CCW</p>  <p>VR6, VR12</p> </div>		
Step 3. Adjust VR5 (A GAIN) and VR11 (B GAIN) on the AT P.C.B. so that the RF envelope output level is flat as shown figure. After this adjustment, adjust VR6 and VR12. (described next adjustment stage)			<div style="text-align: center;"> <p>TP32, TP22 ⊗ VR5, VR11</p> <p>TP32</p>  <p>TP22</p> <p>Minimum Flicker</p> <p>A B</p> <p>VR5 VR11</p> </div>		



1-8. GAIN ADJ. (2)

(S9 AT)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP32	VAR x-1	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR BAR PORTION (0 ~ 6min)	OSCILLO SCOPE	—	VR6 (A COMP) VR12 (B COMP)
Step 1. MACHINE CONDITION			AUTO/PRESET (S9 P.C.B.) : PRESET		
Step 2. Adjust VR6 (A COMP) and VR12 (B COMP) on the AT P.C.B. so that the RF envelope output level is flat, as shown figure.			<div style="text-align: center;"> <p>Minimum Flicker Minimum Flicker</p> <p>TP32</p> <p>TP22 A B</p> <p>VR6 VR12</p> <p>⊗ VR6, VR12</p> </div>		
Step 3. Set the tracking switch on the AT Board to the AUTO position.					

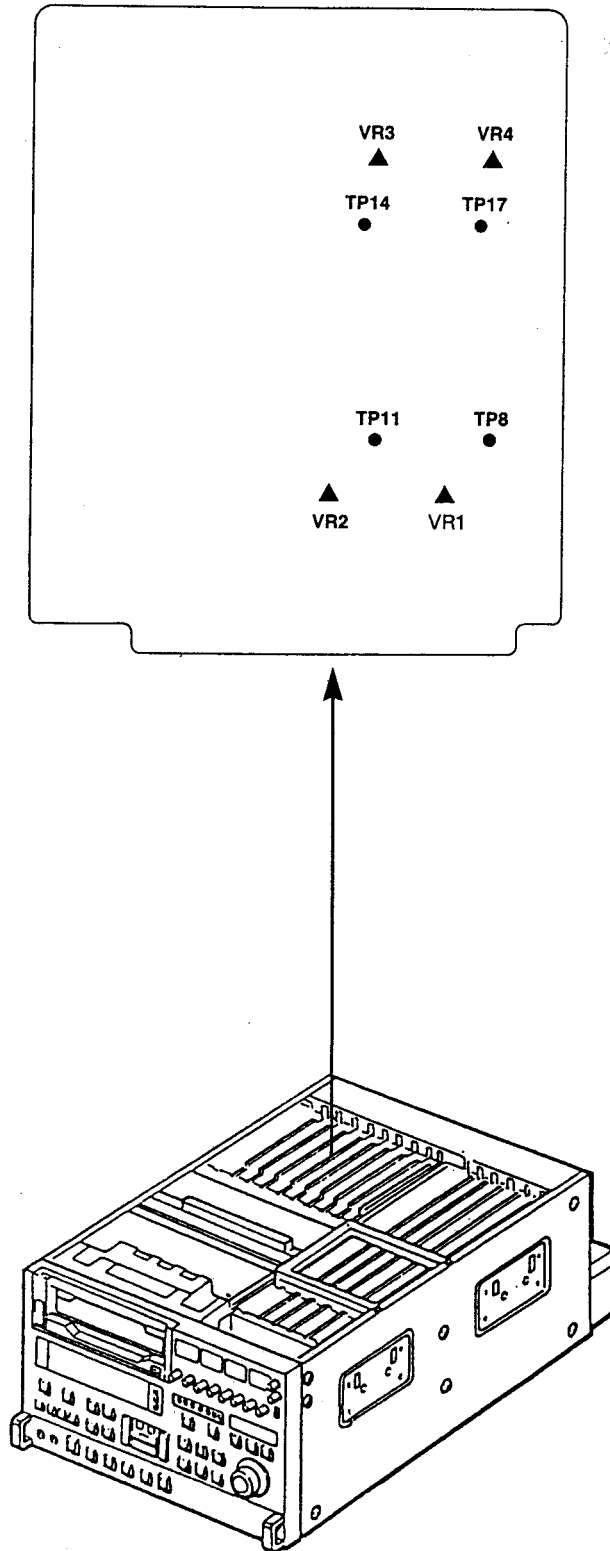


1-9. R/P - AT HEAD AMP BALANCE ADJ.

(S5 RF PROCESSOR)

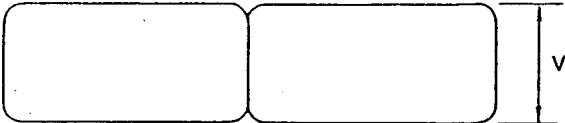
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP8 TP11 TP14 TP17	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>100% COLOUR BAR PORTION (0 ~ 6min)</div>	OSCILLO SCOPE	<div>—</div>	VR1 (Y MIX) VR2 (C MIX) VR3 (Y MIX) VR4 (C MIX)
Step 1. <div>HEAD SELECT : R/P</div> <div>Adjust VR1 (Y MIX) so that the CH1 (V1) and CH2 (V2) is balanced at TP8.</div>			<div>TP8, 11, 14, 17 ⊗ VR1, 2, 3, 4</div> <div><div><div><div></div><div></div></div><div>V1 Max</div></div><div><div><div></div><div></div></div><div>V2 Max</div></div><div></div></div> <div>V1=V2=more than 200 mVp-p</div>		
Step 2. <div>Connect the scope to TP11 and adjust the VR2 (C MIX) so that the CH1 (V1) and CH2 (V2) level is balanced.</div>					
Step 3. <div>HEAD SELECT : PLAY</div> <div>Connect the scope to TP14 and adjust the VR3 (Y MIX) so that the CH1 (V1) and CH2 (V2) level is balanced.</div>					
Step 4. <div>Connect the scope to TP17 and adjust the VR4 (C MIX) so that the CH1 (V1) and CH2 (V2) level is balanced.</div>					

S5 RF PROCESSOR

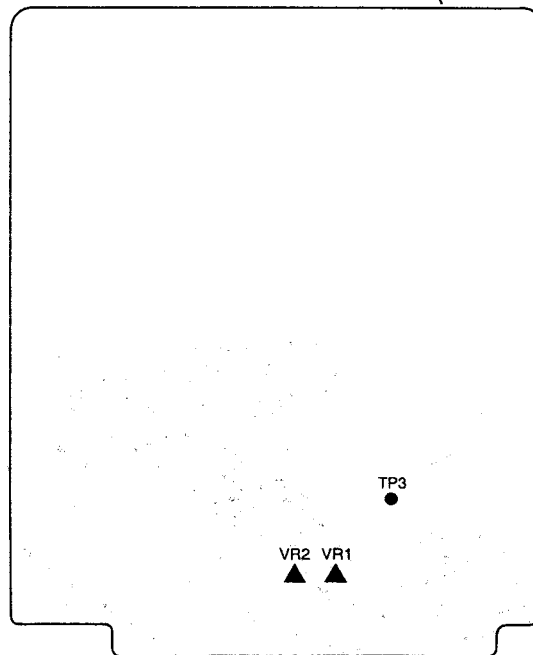


1-10. Y PB RF LEVEL ADJ. (1)

(S4 Y PB)

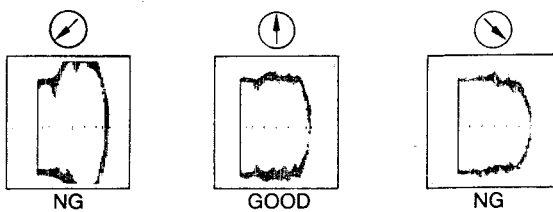
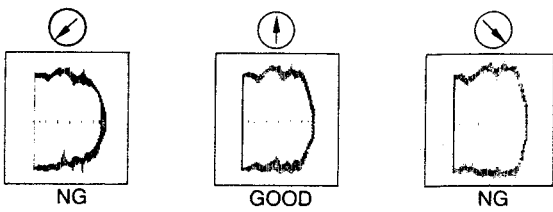
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP3	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>100% COLOUR BAR PORTION (0 ~ 6min)</div>	OSCILLO SCOPE	<div>—</div>	VR1 (R/P RF LEVEL) VR2 (AT RF LEVEL)
Step 1. HEAD SELECT : R/P Adjust VR1 (R/P RF LEVEL) to 300mVp-p ±30mVp-p.			<div>TP3 ⊙ VR1, VR2</div> <div></div> <div>V=300 mVp-p±30 mVp-p</div>		
Step 2. HEAD SELECT : PLAY Adjust VR2 (AT RF LEVEL) to 300mVp-p ±30mVp-p.					

(S4 Y PB)

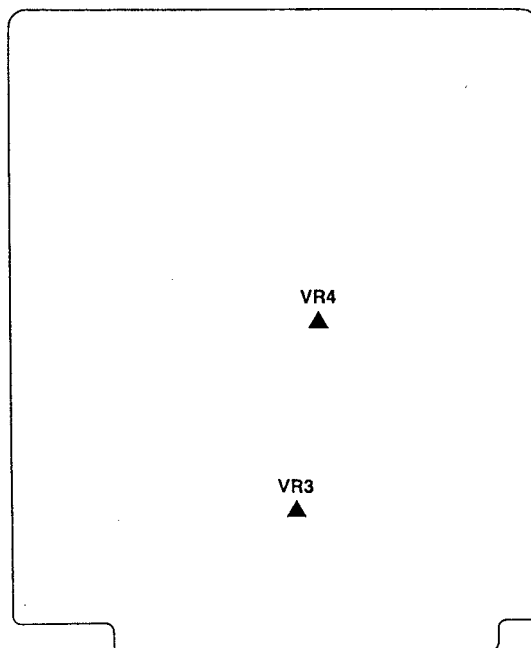


1-11. Y PB EQ TERM ADJ.

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 60% SWEEP PORTION (6 ~ 12min)	WFM MONITOR	-----	VR3 (TERM 1) VR4 (TERM 2)
Step 1. Set the VR3 (TERM 1) at 12:00 o'clock position. Confirm that the frequency characteristic is flat. If it is not, adjust VR3 so that the frequency characteristic is flat.			VR3 (TERM 1) ---> 12:00 o'clock 		
Step 2. Set the VR4 (TERM 2) at 12:00 o'clock position. Confirm that the frequency characteristic is flat. If it is not, adjust VR4 so that the frequency characteristic is flat.			VR4 (TERM 2) ---> 12:00 o'clock 		

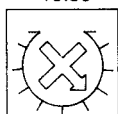
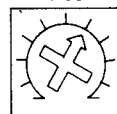
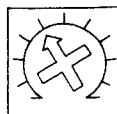
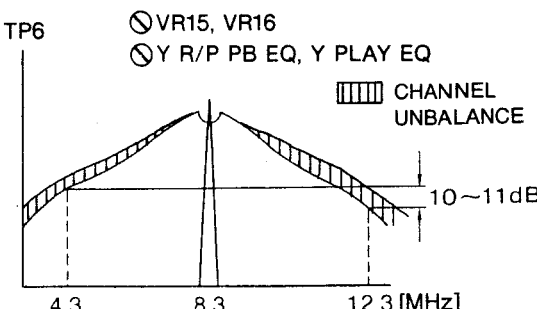
S4 Y PB



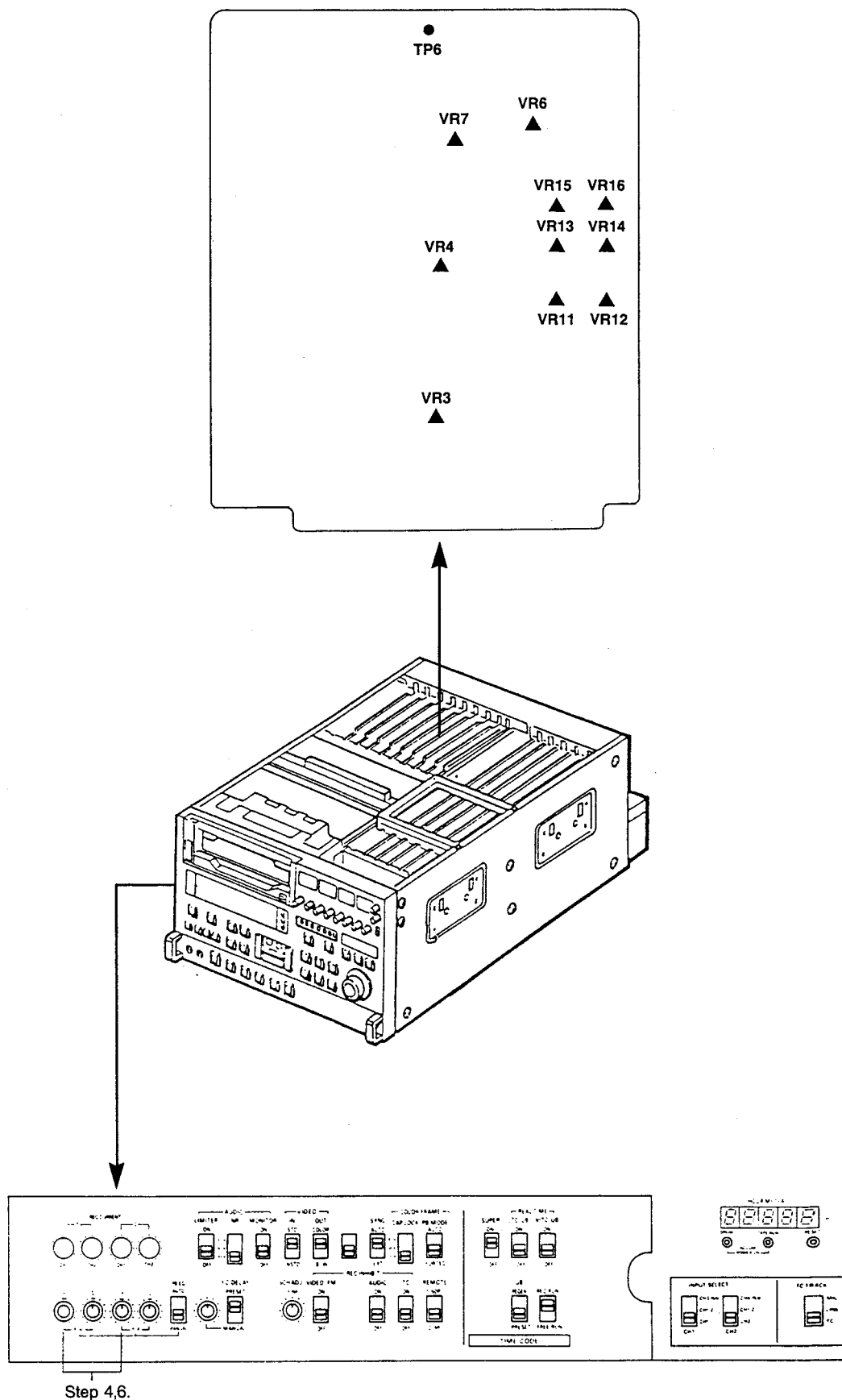
1-12. Y PB EQ FREQUENCY RESPONSE ADJ.

If spectrum analyzer is available.

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP6	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>60% SWEEP PORTION (6min ~ 12min)</div>	SPECTRUM ANALYZER	-----	VR7 (EQ 3) VR6 (EQ 4) VR15 (EQ 2 AT BAL) VR16 (EQ 2 R/P BAL) VR13 (EQ 1 R/P CH1) VR14 (EQ 1 R/P CH2) VR11 (EQ 1 AT CH1) VR12 (EQ 1 AT CH2) Y R/P PLAY EQ (Front Sub)
Step 1. Set the spectrum analyzer.			CENT FREQ : 8.3MHz SPAN : 10MHz REF : -22dB SHIFT : 5dB BAND : 100KHz VIDEO BAND : 300KHz SWEEP TIME : 5sec		
Step 2. Set the position of VRs.			<div><div>10:30  VR6</div><div>1:00  VR7</div><div>11:00  VR11 VR13 VR12 VR14</div></div> <div>Component Side View</div>		
Step 3. HEAD SELECT : R/P Adjust VR16 (EQ2 R/P BAL) so that the CH1 and CH2 level is balanced.			<div>TP6</div> <div>⊗ VR15, VR16 ⊗ Y R/P PB EQ, Y PLAY EQ</div> <div></div> <div>10~11dB</div> <div>4.3 8.3 12.3 [MHz]</div>		
Step 4. Adjust the Y R/P PB EQ on the front sub-panel so that the 4.3MHz and 12.3MHz level is balanced as shown figure.					
Step 5. HEAD SELECT : PLAY Adjust VR15 (EQ 2 AT BAL) so that the CH1 and CH2 level is balanced.					
Step 6. Adjust the Y PLAY PB EQ on the front sub-panel so that the 4.3MHz AND 12.3 MHz level is balanced as shown figure.					
Note: After this adjustment, Y PB frequency adjustment is required.					

S4 Y PB



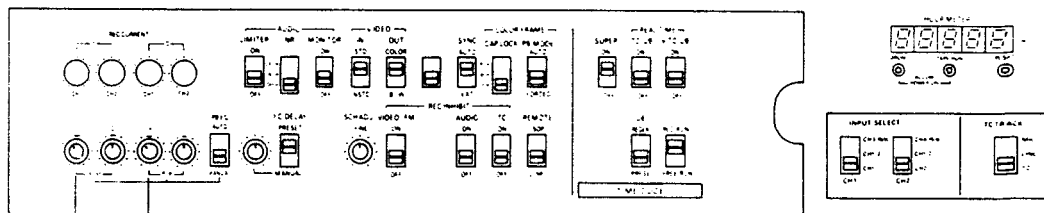
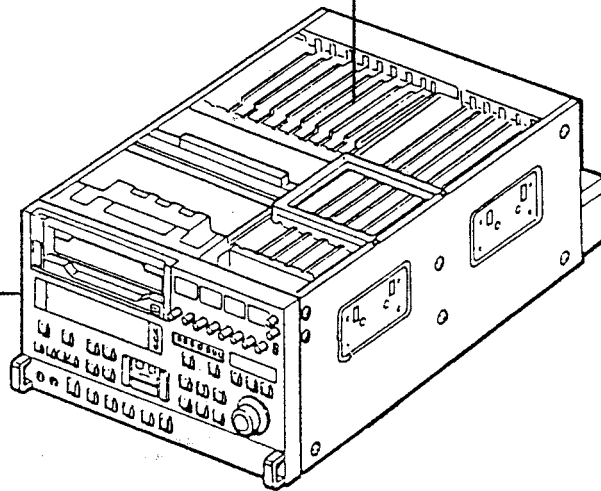
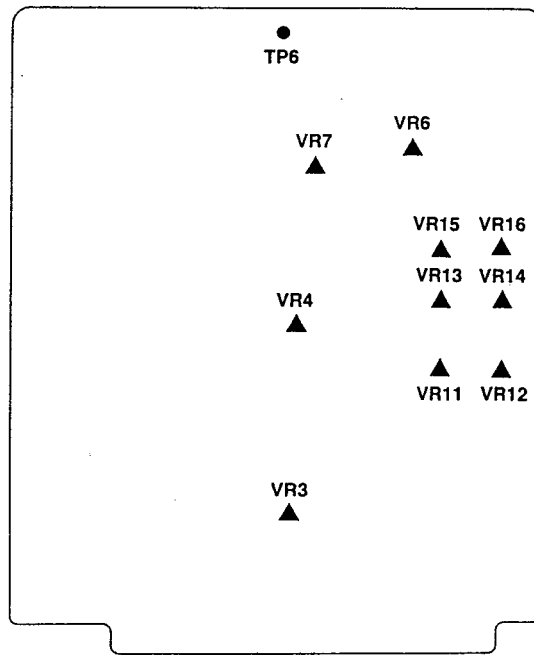
1-12-1. Y PB FREQUENCY RESPONSE ADJ.

If spectrum analyzer is not available.

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 60% SWEEP PORTION (6min ~ 12min)	WFM MONITOR	-----	VR3 (TERM1) VR4 (TERM2) VR7 (EQ 3) VR6 (EQ 4) VR15 (EQ 2 AT BAL) VR16 (EQ 2 R/P BAL) VR13 (EQ 1 R/P CH1) VR14 (EQ 1 R/P CH2) VR11 (EQ 1 AT CH1) VR12 (EQ 1 AT CH2) Y R/P, PLAY EQ (Front Sub)
Step 1. VRs Setting.			<div> <div>10:30</div> <div>1:00</div> <div>11:00</div> </div> <div> </div> <div> VR6 VR7 VR11 VR13 VR12 VR14 </div> <div>Component Side View</div>		
Step 2. Set Y PB EQ (Front Sub) as shown figure.			<div> <div>11:00</div> <div>11:00</div> <div>MANUAL</div> </div> <div> </div> <div> PLAY R/P PB EQ AUTO MANUAL </div>		
Step 3. Turn following VRs CCW so that the frequency characteristics is shown figure. VR13 (EQ1 R/P CH1) VR14 (EQ1 R/P CH2) VR11 (EQ1 AT CH1) VR12 (EQ1 AT CH2)					
Step 4. Adjust VR3 (TERM1), VR4 (TERM2) and VR7 (EQ3) so that the frequency characteristic is shown figure.			Make a triangle waveform 		
Step 5. Adjust following VRs so that the frequency characteristic is flat as shown figure. VR13 (EQ1 R/P CH1) VR14 (EQ1 R/P CH2) VR11 (EQ1 AT CH1) VR12 (EQ1 AT CH2)			Make a flat waveform 		

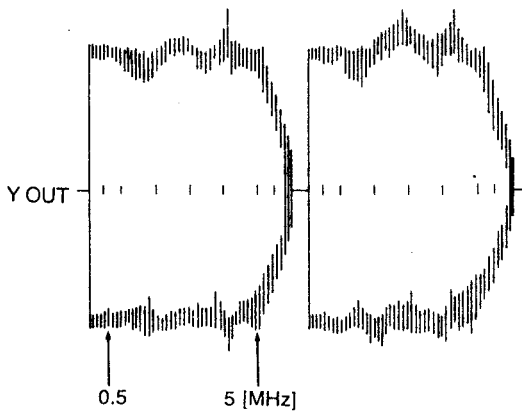
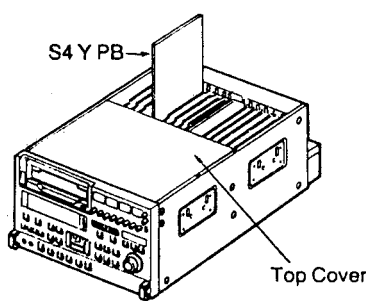
S4 Y PB

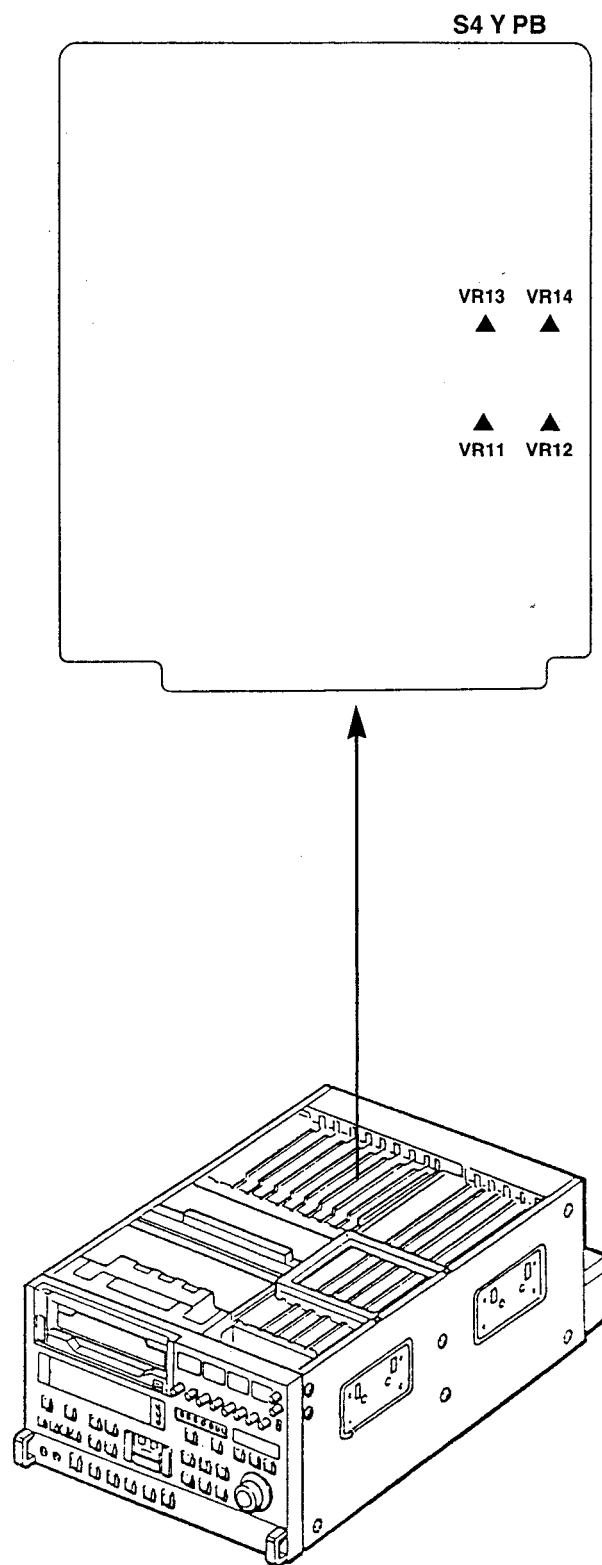


Step 2.

1-13. Y PB FREQUENCY RESPONSE ADJ.

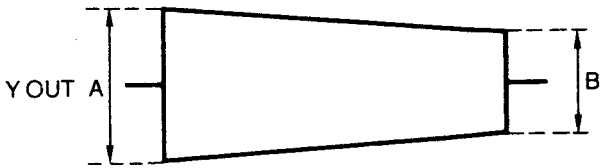
(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> 60% SWEEP PORTION (6min ~ 12min)	WFM MONITOR	-----	VR11 (EQ1 AT CH1) VR12 (EQ1 AT CH2) VR13 (EQ1 R/P CH1) VR14 (EQ1 R/P CH2)
Step 1. <div>PB EQ SW : Manual (Front Sub)</div>					
Step 2. <div>HEAD SELECT : R/P Adjust VR13 (EQ1 R/P CH1) and VR14 (EQ1 R/P CH2) so that the frequency characteristic is in specification.</div>					
Step 3. <div>HEAD SELECT : PLAY Adjust VR11 (EQ1 AT CH1) and VR12 (EQ1 AT CH2) so that the frequency characteristic is in specification.</div>					
Step 4. Confirm that the frequency response is in specification.			SPEC for E, OR version REF : 0.5MHz (100%) 1MHz : 95 ~ 105% 2MHz : 94 ~ 104% 3MHz : 92 ~ 103% 4MHz : 91 ~ 102% 5MHz : 90 ~ 101% SPEC for B version REF : 0.5MHz (100%) 0.5MHz ~ 5MHz : 100 ± 5%		
Note: It should be better to cover the half of top by top panel while adjusting.					



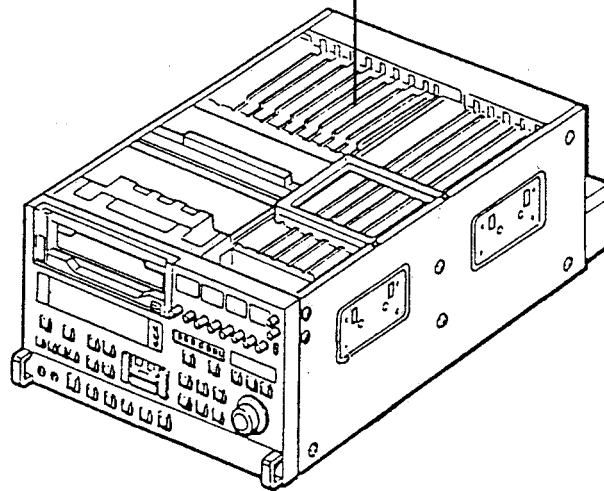
1-14. HF LINEARITY ADJ.

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT RAMP SIGNAL (12min ~ 15min)	WFM MONITOR	-----	VR6 (EQ 4)
Step 1. WFM Monitor Setting.			RESPONSE : 4.43 B P F mode.		
Step 2. HEAD SELECT : R/P Adjust VR6 (EQ 4) as shown figure. Note: If it is in specification before adjustment, do not adjust VR6 (EQ 4).			<div style="text-align: right;">Level difference → In a specification</div> ⊗ VR6 <div style="text-align: right;">A:B=100:100±5</div> 		

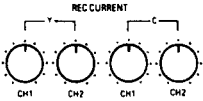
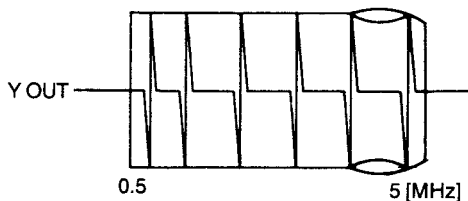
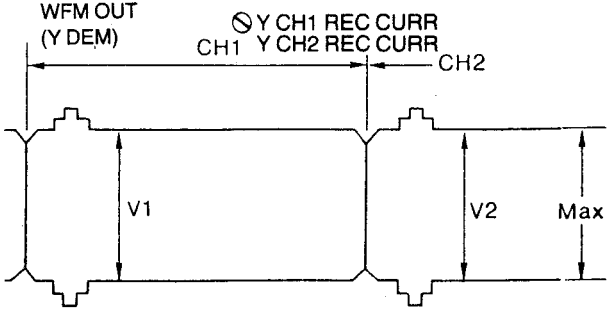
S4 Y PB

VR6
▲

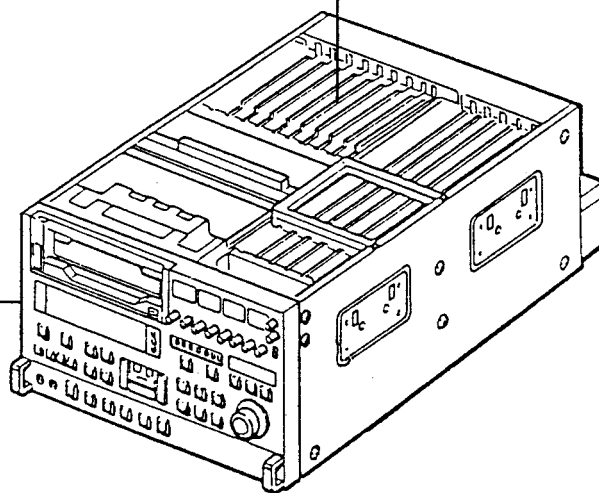
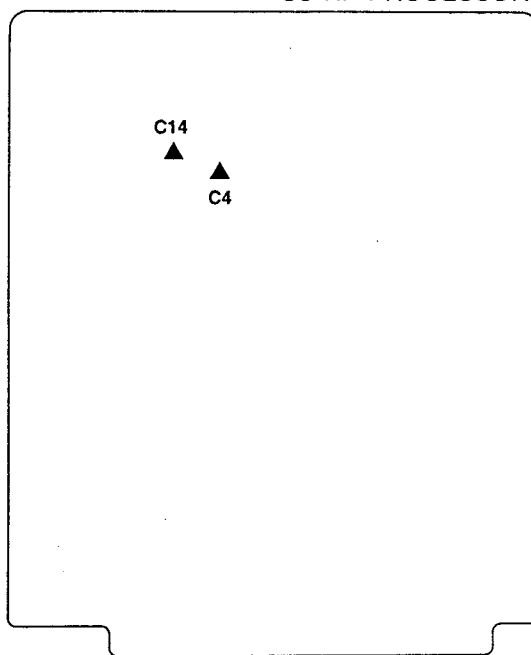


1-15. Y REC CURRENT ADJ.

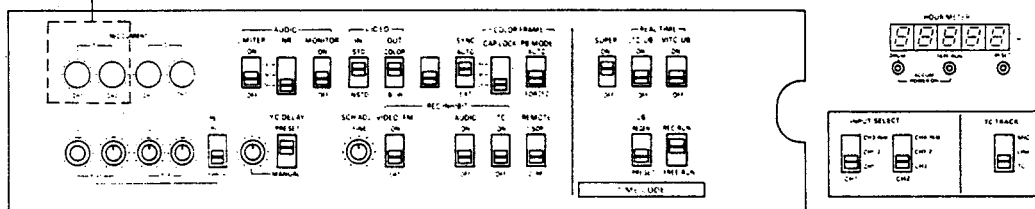
(S5 RF PROCESSOR)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
WFM OUT (Y DEM) COMPONENT Y OUT	CONFIDENCE PLAYBACK ↓ REC·PLAY	<div>■ BLANK</div> <div>□ ALIGNMENT</div>	OSCILLO SCOPE	COMPONENT 60% SWEEP	C4 C14 Y CH1, CH2 REC CURR (Front Sub)
Step 1. Set Y REC CURR VR (Front Sub) to 12:00 o'clock position.					
Step 2. During recording, adjust C4 and C14 so that the frequency characteristic is in specification.			<div> ⊙ C4 C14 </div> <div>0.5~5 MHz: 100±5%</div> 		
Step 3. Adjust Y REC CURR VR (Front Sub) so that the waveform is just before maximum.					
Step 4. Confirm that the frequency response is in specification. If it is not, readjust the REC CURR.			<div> SPEC for E, OR version REF : 0.5MHz (100%) 1MHz : 95 ~ 105% 2MHz : 94 ~ 104% 3MHz : 92 ~ 103% 4MHz : 91 ~ 102% 5MHz : 90 ~ 101% </div> <div> SPEC for B version REF : 0.5MHz (100%) 0.5MHz ~ 5MHz : 100±5% </div>		

S5 RF PROCESSOR

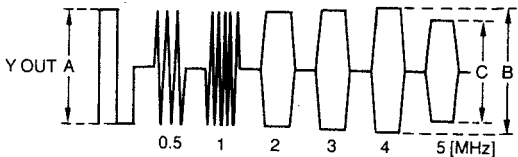


Step 1.



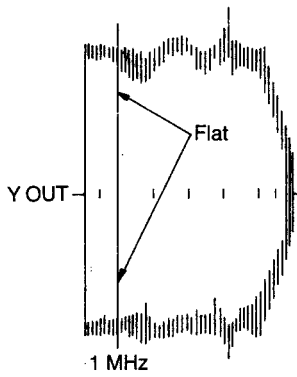
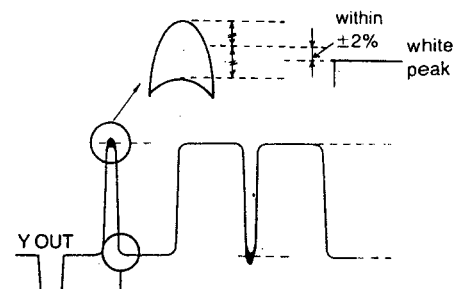
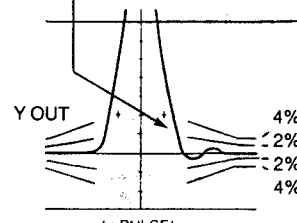
1-16. Y MULTI BURST CONFIRMATION

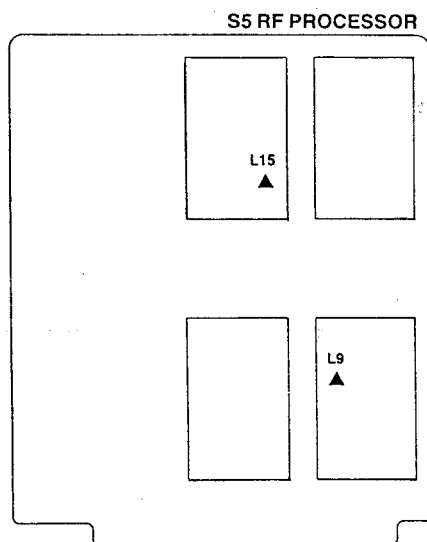
(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	SELF RECORDING ↓ PLAY	<div> <div></div> BLANK <div></div> ALIGNMENT </div>	WFM MONITOR	COMPONENT 60% MULTI BURST	-----
Step 1. MACHINE : CONDITION			INPUT SELECT : COMPONENT		
Step 2. HEAD SELECT : R/P Confirm that the 4MHz portion (B) and 5MHz portion (C) levels are in specification.			(SPEC for E, OR) A=100, B+C=192±2 (B=91~102, C=90~101) (SPEC for B) A=100, B+C=200±2 (B,C=100±5)		
Step 3. HEAD SELECT : PLAY Confirm that the 4MHz portion (B) and 5MHz portion (C) levels are in specification.					

1-17. Y K FACTOR ADJ.

(S5 RF PROCESSOR)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	SELF RECORDING ↓ PLAY	<div>■</div> BLANK <div>□</div> ALIGNMENT	WFM MONITOR	COMPONENT 60% SWEEP COMPONENT 2T PULSE	L9 L15
Step 1. HEAD SELECT : R/P and PLAY Playback the 60% sweep portion and confirm the 1MHz portion of 60% sweep is flat as shown figure.					
Step 2. HEAD SELECT : R/P Playback the 2T pulse portion and adjust L9 so that the KA portion is within $\pm 2\%$ and kp portion is flat as shown figure.					
Step 3. HEAD SELECT : PLAY Playback the 2T pulse portion and adjust L15 so that the KA portion is within $\pm 2\%$ and kp portion is flat as shown figure.					

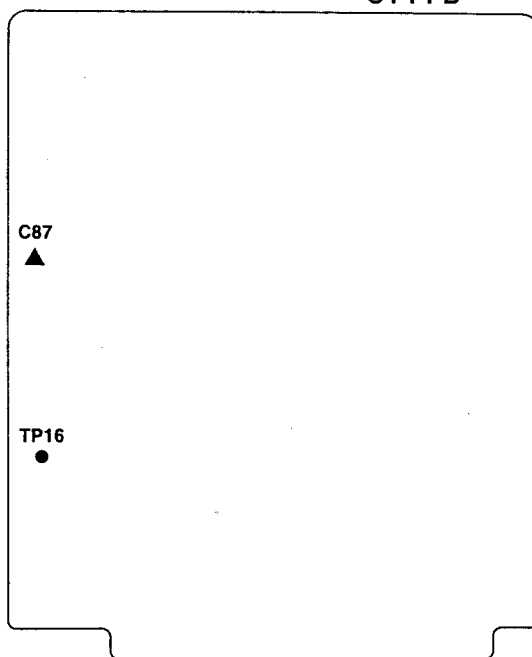


1-18. Y K-FACTOR ADJ. (1)

(S4 Y PB)

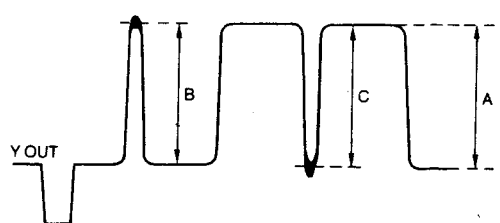
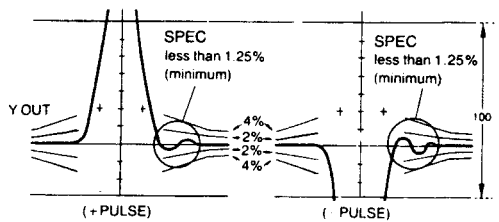
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP16	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR BAR PORTION (0 ~ 6min)	OSCILLO SCOPE	-----	C87 (K B)
Adjust C87 (K B) as shown figure.					

S4 Y PB

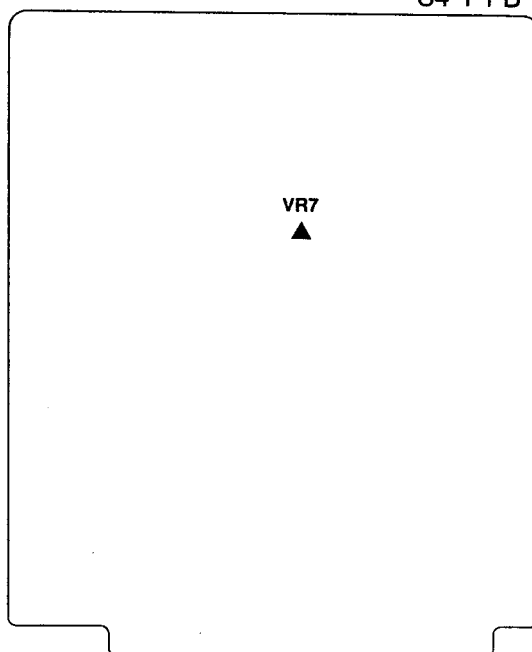


1-18-1. Y K FACTOR ADJ. (2)

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	SELF RECORDING	<div>■ BLANK</div> <div>□ ALIGNMENT</div>	WFM MONITOR	COMPONENT SIN2 2T PULSE	VR7 (EQ 3)
Step 1. Confirm KA of + Pulse and - Pulse			$A = 100, 97 \leq B, C \leq 103$ 		
Step 2. Confirm Kp of + Pulse and - Pulse					
Step 3. If out of spec. ----> Adjust VR7 (EQ 3)			Note 1: If adjust VR7, frequency response confirmation is necessary. Note 2: Measure the centre portion of Noise-Moire while adjustment.		

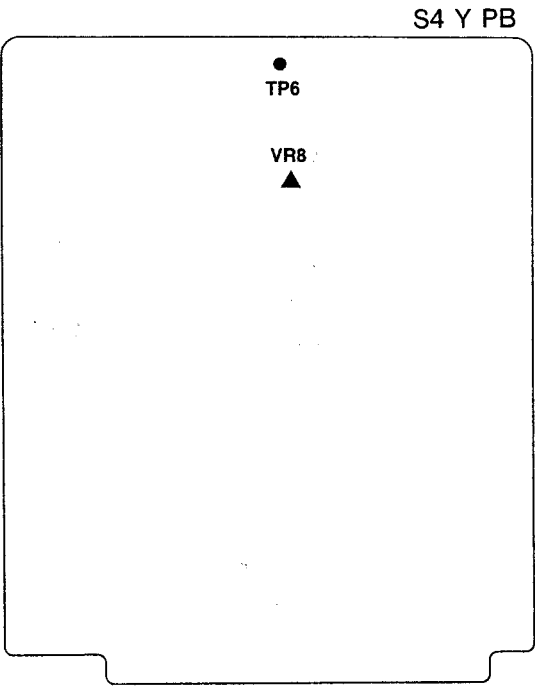
S4 Y PB



1-19. Y PB RF LEVEL ADJ. (2)

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP6	PLAY	<div><div>□ BLANK</div><div>■ ALIGNMENT</div></div> <div>100% COLOUR BAR PORTION (0 ~ 6min)</div>	OSCILLO SCOPE	-----	VR8. (V-V RF LEV)
Adjust VR8 as shown figure.			<div>TP6 RF Level → In specification</div> <div><div><div>V1</div></div><div><div>V2</div></div></div> <div>V1 = V2 = 600 +/- 100mVp-p</div>		



1-20. Y AUTO EQ LIMITER ADJ.

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP7 Pin 1 of IC31	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 60% SWEEP PORTION (6min~12min)	OSCILLO SCOPE	-----	VR26 (AUTO EQ LIM)

Step 1.

HEAD SELECT : R/P

Connect the scope CH1 to TP7 and CH2 to Pin 1 of IC31 then set the scope to DC mode. When changing to PLAY mode from the R/P mode with the HEAD SELECT switch, observe the maximum DC level and minimum DC level at TP7.

⊙ VR26

max DC

IC31-1 pin
(centre of DC offset)

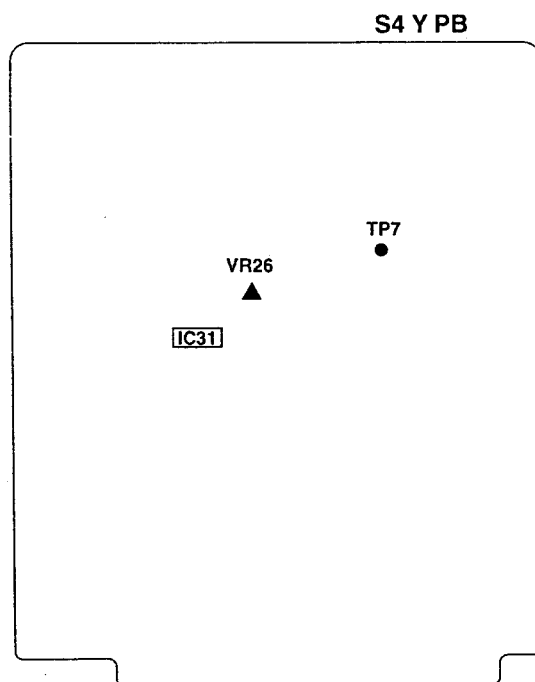
min DC

TP7

(R/P) (PLAY) GND

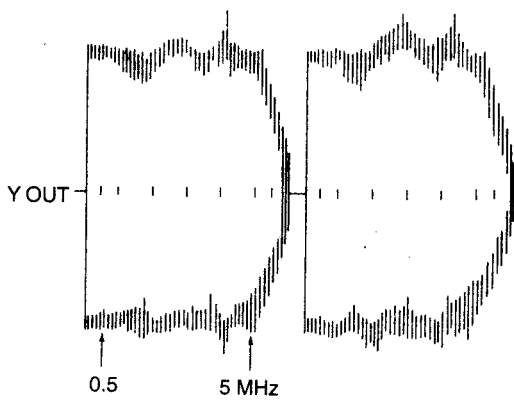
Step 2.

Adjust VR26 (AUTO EQ LIM) so that the DC level at Pin 1 of IC31 is centred between maximum DC level and minimum DC level at TP7 as shown.

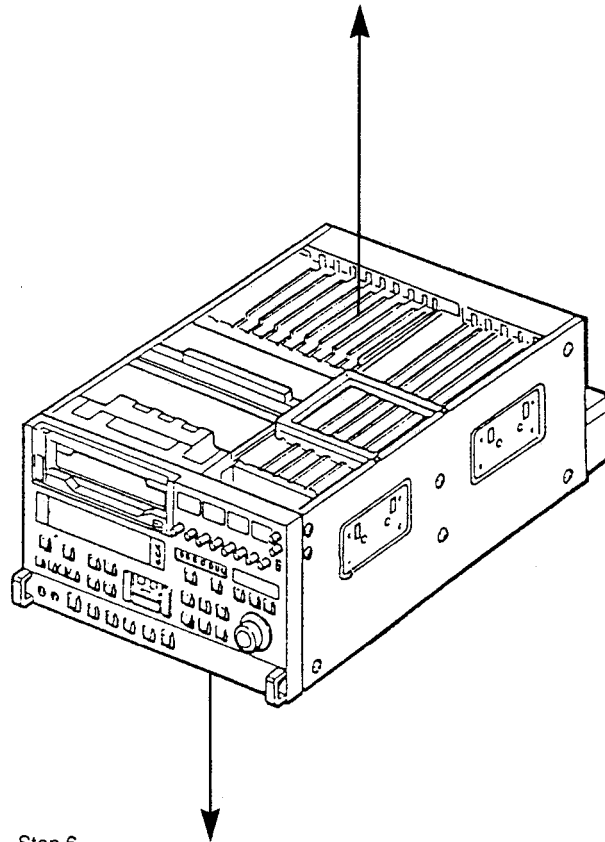
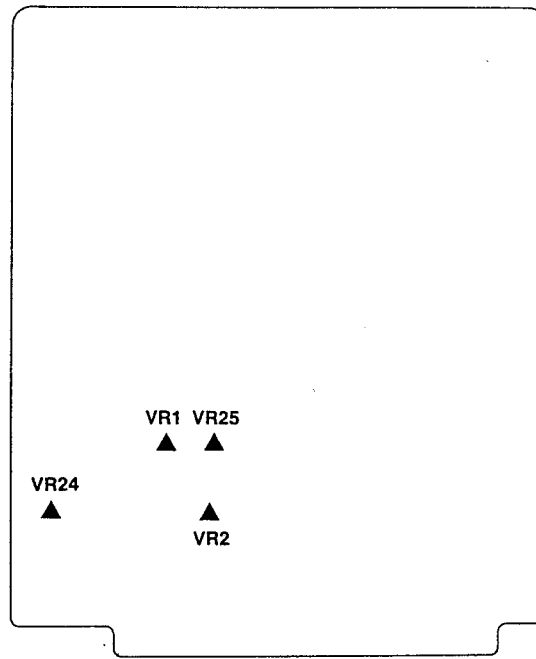


1-21. Y AUTO EQ FREQUENCY ADJ. (1)

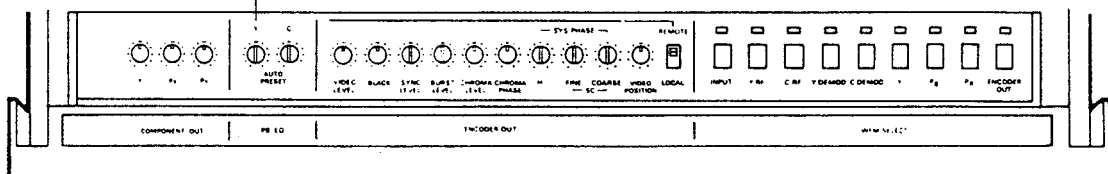
(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Y OUT	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>60% SWEEP PORTION (6min ~ 12min)</div>	WFM MONITOR	-----	VR1 (EQ1 AT CH1) VR2 (EQ1 AT CH2) VR25(AUTO EQ BAL) (above VRs on the small P.C. Board) VR24(AUTO EQ PRESET) Y PB EQ VR (Pull out drawer)
Step 1. MACHINE CONDITION			PB EQ SW : AUTO Y PB EQ : Centre Click Position (Pull Out Drawer)		
Step 2. HEAD SELECT : R/P Adjust VR25 (AUTO EQ BAL) on the AUTO EQ SUB P.C.B. so that the CH1 and CH2 is balanced as shown.			<div>⊙ VR25, VR24, VR1, VR2, Y PB EQ</div> 		
Step 3. Adjust VR24 (AUTO EQ PRESET) so that the frequency characteristic is same as manual EQ as shown.					
Step 4. HEAD SELECT : PLAY Adjust VR1 (EQ AT CH2) on the AUTO EQ SUB P.C.B. so that the channel is balanced.					
Step 5. Adjust VR2 (EQ AT CH2) on the AUTO EQ SUB P.C.B. so that the frequency characteristic is same as manual EQ.					
Step 6. Set the PB EQ switch on the front sub panel to AUTO position and confirm that the frequency characteristic will be changed by smoothly turning the Y PB EQ VR on the pull out drawer as shown.					
			<div><div>SPEC for E, OR version</div><div>REF : 0.5MHz (100%) 1MHz : 95 ~ 105% 2MHz : 94 ~ 104% 3MHz : 92 ~ 103% 4MHz : 91 ~ 102% 5MHz : 90 ~ 101%</div><div>SPEC for B version</div><div>REF : 0.5MHz (100%) 0.5MHz ~ 5MHz : 100±5%</div></div>		

S4 Y PB

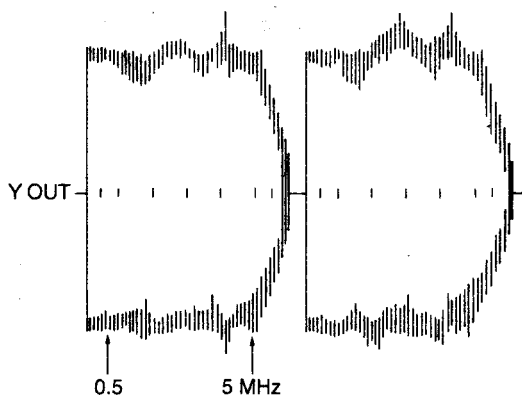


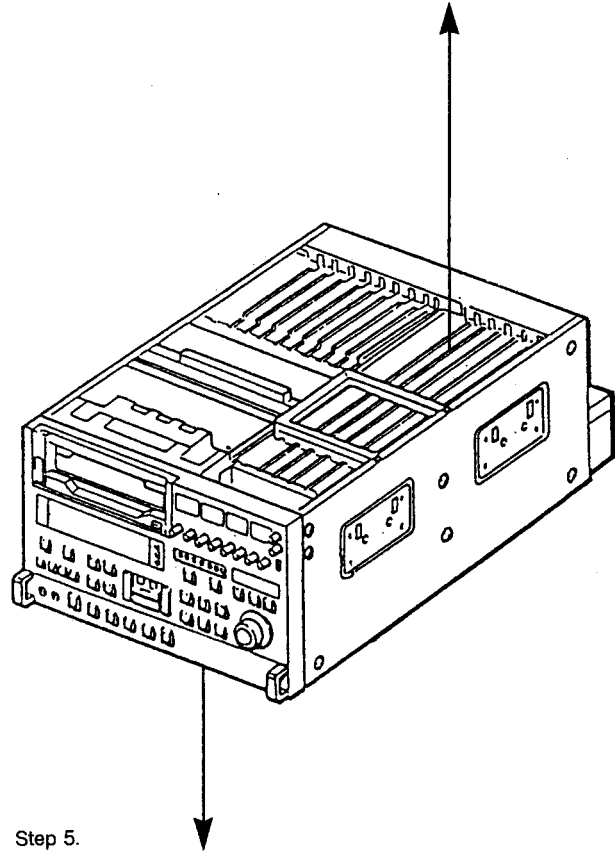
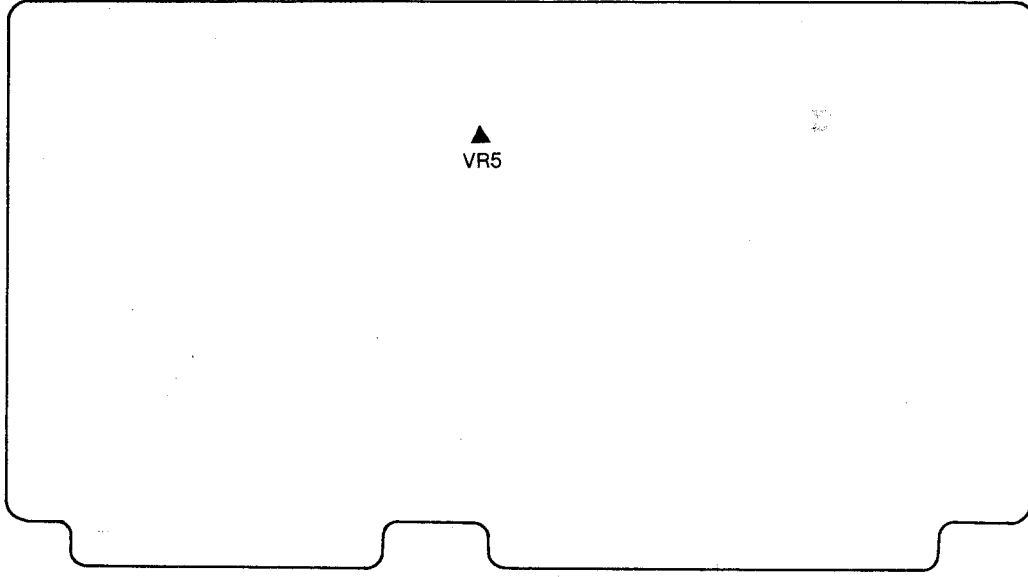
Step 6.



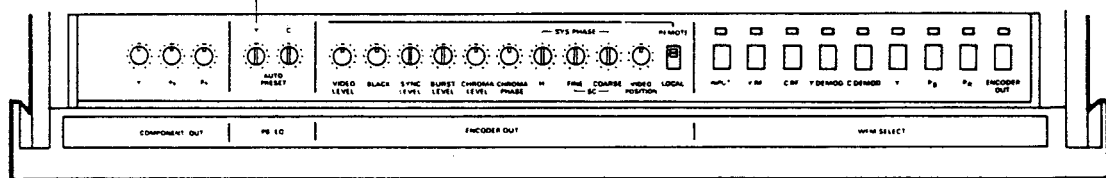
1-22. Y AUTO EQ FREQUENCY ADJ. (2)

(L4 CTOM)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
Y OUT	SELF/REC ↓ PLAY	■ BLANK □ ALIGNMENT	WFM MONITOR	COMPONENT 60% SWEEP	VR5 (Y BU LEVEL)
Step 1. MACHINE CONDITION			INPUT SELECT : COMPONENT TAPE/EE : TAPE PB EQ SW : AUTO Y PB EQ : Centre Click Position (Pull Out Drawer)		
Step 2. HEAD SELECT : R/P Confirm that the frequency response is same as manual EQ.					
Step 3. If it is not, slightly adjust VR5 so that the frequency response is same as manual EQ as shown.					
Step 4. HEAD SELECT : PLAY Confirm that the frequency response is same as manual EQ.					
Step 5. Set the PB EQ switch on the front sub panel to AUTO position and confirm that the frequency response will be changed by smoothly turning the Y PB EQ VR on the pull out drawer.			SPEC for E, OR version REF : 0.5MHz (100%) 1MHz : 95 ~ 105% 2MHz : 94 ~ 104% 3MHz : 92 ~ 104% 4MHz : 91 ~ 102% 5MHz : 90 ~ 101%		
			SPEC for B version REF : 0.5MHz (100%) 0.5MHz ~ 5MHz : 100±5%		

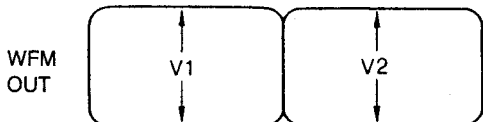
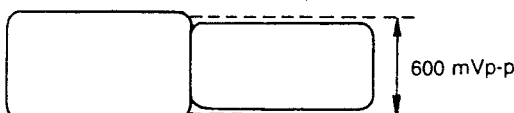


Step 5.

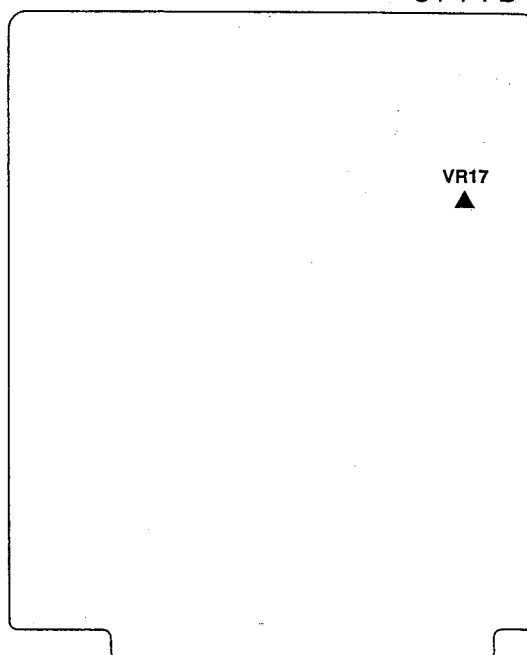


1-23. Y WFM RF LEVEL ADJ.

(S4 Y PB)

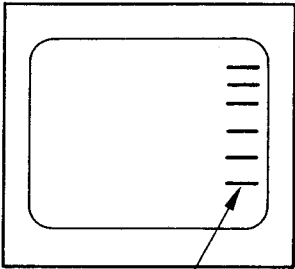
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
WFM OUT (Y RF)	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR BAR PORTION (0 ~ 6min)	OSCILLO SCOPE	-----	VR17 (WFM RF LEV)
Adjust VR17 (WFM RF LEV) as shown.			<p>RF Level → In specification</p>  <p>$V1 = V2 = 600 \pm 100\text{mVp-p}$</p>		
If there is a channel difference, RF level should be adjusted at average level between CH1 and CH2.					

S4 Y PB



1-24. Y OVER MODULATION CONFIRMATION

(S4 Y PB)

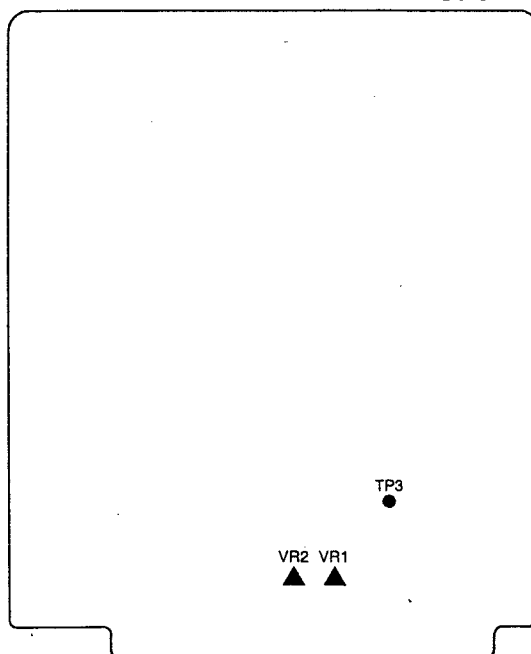
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
VIDEO 2 OUT	SELF RECORDING	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	TV MONITOR	COMPONENT 100% SWEEP	-----
Step 1. Overmodulation → Not appeared on the monitor TV.			<div style="text-align: center;"> <p>MONITOR</p>  <p>Overmodulation Noise</p> </div>		
Step 2. If overmodulation noise appears, head erase or EQ re-adjustment is necessary.					

1-25. C PB RF LEVEL ADJ. (1)

(S3 C PB)


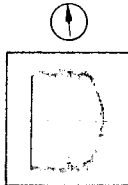
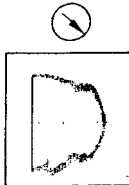
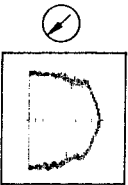
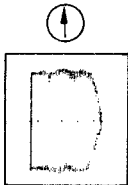
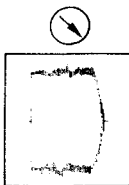
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP3	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>100% COLOUR BAR PORTION (0 ~ 6min)</div>	OSCILLO SCOPE	-----	VR1 (R/P RF LEVEL) VR2 (AT RF LEVEL)
Step 1. HEAD SELECT : R/P Adjust VR1 (R/P RF LEVEL) to 300mVp-p ±30mVp-p.			<div>TP3 ⊙ VR1, VR2</div> <div><div>CH1</div><div>CH2</div></div> <div><div>V1</div><div>V2</div></div> <div>V1 = V2 = 300 mVp-p ± 30 mVp-p</div>		
Step 2. HEAD SELECT : PLAY Adjust VR2 (AT RF LEVEL) to 300mVp-p ±30mVp-p.					

S3 C PB

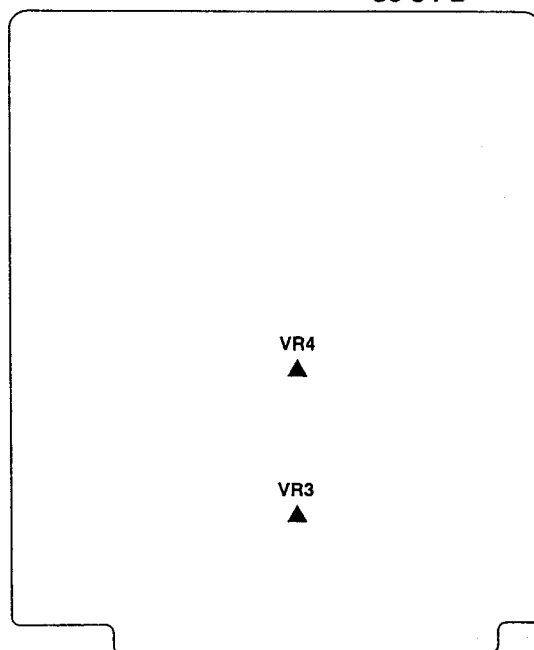


1-26. C PB TERM ADJ.

(S3 C PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pb, Pr OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR BAR PORTION (0 ~ 6min)	WFM MONITOR	-----	VR3 (TERM 1) VR4 (TERM 2)
Step 1. Set the VR3 (TERM 1) at 11:30 o'clock position. Confirm that the frequency characteristic is flat. If it is not, adjust VR3 so that the frequency characteristic is flat.			VR3 (TERM 3) → 11:30 o'clock <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  NG </div> <div style="text-align: center;">  GOOD </div> <div style="text-align: center;">  NG </div> </div>		
Step 2. Set the VR1 (TERM 2) at 12:00 o'clock position. Confirm that the frequency characteristic is flat. If it is not, adjust VR4 so that the frequency characteristic is flat.			VR4 (TERM 2) → 12:00 o'clock <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  NG </div> <div style="text-align: center;">  GOOD </div> <div style="text-align: center;">  NG </div> </div>		

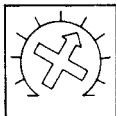
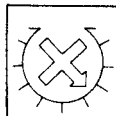
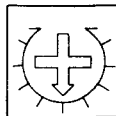

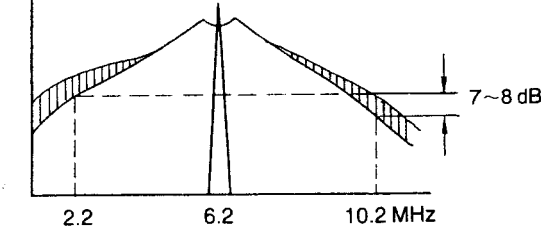
S3 C PB



1-27. C PB EQ FREQUENCY RESPONSE ADJ.

If spectrum analyzer is available.

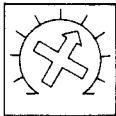
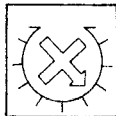
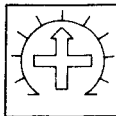



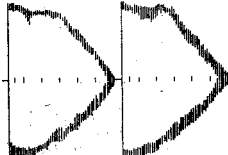
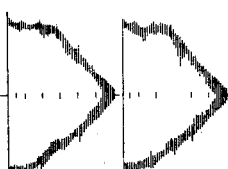
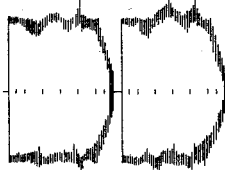
(S3 C PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP6	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>60% SWEEP PORTION (6min ~ 12min)</div>	SPECTRUM ANALYZER	-----	VR5 (EQ4) VR6 (EQ3) VR10 (EQ1 AT CH1) VR11 (EQ1 AT CH2) VR12 (EQ1 R/P CH1) VR13 (EQ1 R/P CH2) VR14 (EQ2 AT BAL) VR15 (EQ2 R/P BAL) C R/P, PLAY EQ (Front Sub)
Step 1. Set the spectrum analyzer.			CENT FREQ : 6.2MHz SPAN : 10MHz REF : -22dB SHIFT : 5dB BAND : 100KHz VIDEO BAND : 300KHz SWEEP TIME : 5sec		
Step 2. Set the position of VRs.			<div><div>1:00  VR6</div><div>10:30  VR5</div><div>12:00  VR10 VR12 VR11 VR13</div></div>		
Step 3. HEAD SELECT : R/P Adjust the VR15 (EQ R/P BAL) so that the CH1 and CH2 is balanced.			<div><div>TP6</div><div>⊙ VR14, VR15 C R/P PB EQ C PLAY PB EQ</div><div> CHANNEL UNBALANCE</div></div>		
Step 4. Adjust the C R/P PB EQ on the front sub-panel so that the level of 2.2MHz and 10.2MHz is balanced.					
Step 5. HEAD SELECT : PLAY Adjust the VR14 (EQ AT BAL) so that the CH1 and CH2 is balanced.					
Step 6. Adjust the C PLAY PB EQ on the front sub-panel so that the level between 2.2MHz and 10.2MHz is balanced.					
Note: After this adjustment, C PB FREQUENCY adjustment is required.					

1-27-1. PB EQ FREQUENCY RESPONSE ADJ.

If spectrum analyzer is not available.

(S3 C PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pr, Pb OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 60% SWEEP PORTION (6min ~ 12min)	WFM MONITOR	-----	VR3 (TERM 1) VR4 (TERM 2) VR5 (EQ4) VR6 (EQ3) VR10 (EQ1 AT CH1) VR11 (EQ1 AT CH2) VR12 (EQ1 R/P CH1) VR13 (EQ1 R/P CH2) VR14 (EQ2 AT BAL) VR15 (EQ2 R/P BAL) C R/P, PLAY EQ (Front Sub)
Step 1. VRs setting.			<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> 1:00  VR6 </div> <div style="text-align: center;"> 10:30  VR5 </div> <div style="text-align: center;"> 12:00  VR10 VR12 VR11 VR13 </div> </div>		
Step 2. Set C PB EQ (Front Sub) as shown.			<div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: center;"> 11:00  PLAY </div> <div style="text-align: center;"> 11:00  R/P </div> <div style="text-align: center;"> MANUAL  MANUAL </div> </div>		
Step 3. Turn following VRs CCW so that the frequency characteristics as shown. VR10 (EQ1 AT CH1) VR11 (EQ1 AT CH2) VR12 (EQ1 R/P CH1) VR13 (EQ1 R/P CH2)					
Step 4. Adjust VR3 (TERM 1), VR4 (TERM 2) and VR6 (EQ3) so that the frequency characteristic as shown.			Make a triangle waveform 		
Step 5. Adjust following VRs so that the frequency characteristic is flat as shown. VR10 (EQ1 AT CH1) VR11 (EQ1 AT CH2) VR12 (EQ1 R/P CH1) VR13 (EQ1 R/P CH2)			Make a flat waveform 		

S3 C PB

TP6

VR5

VR6

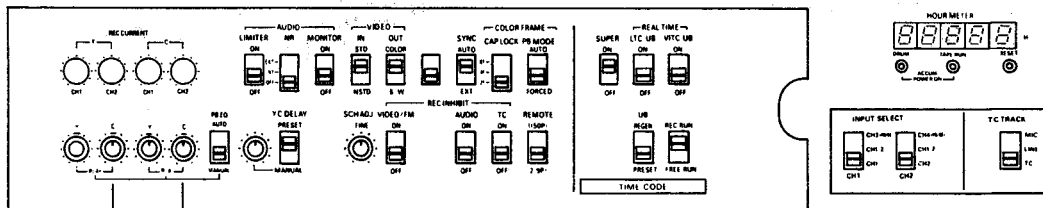
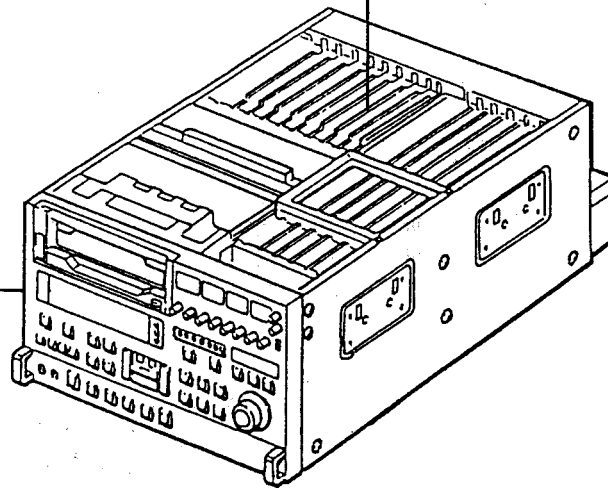
VR14 VR15

VR4

VR12 VR13

VR10 VR11

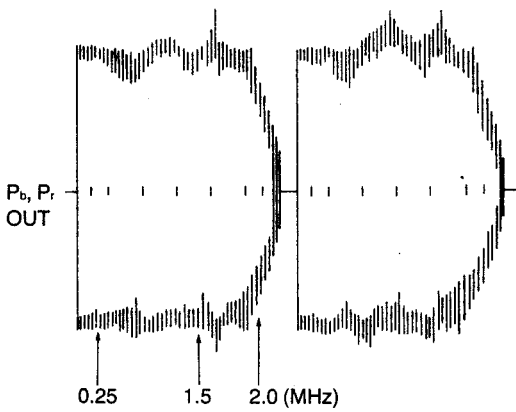
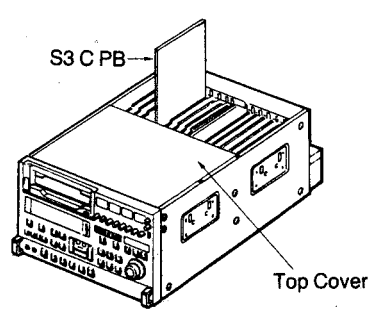
VR3

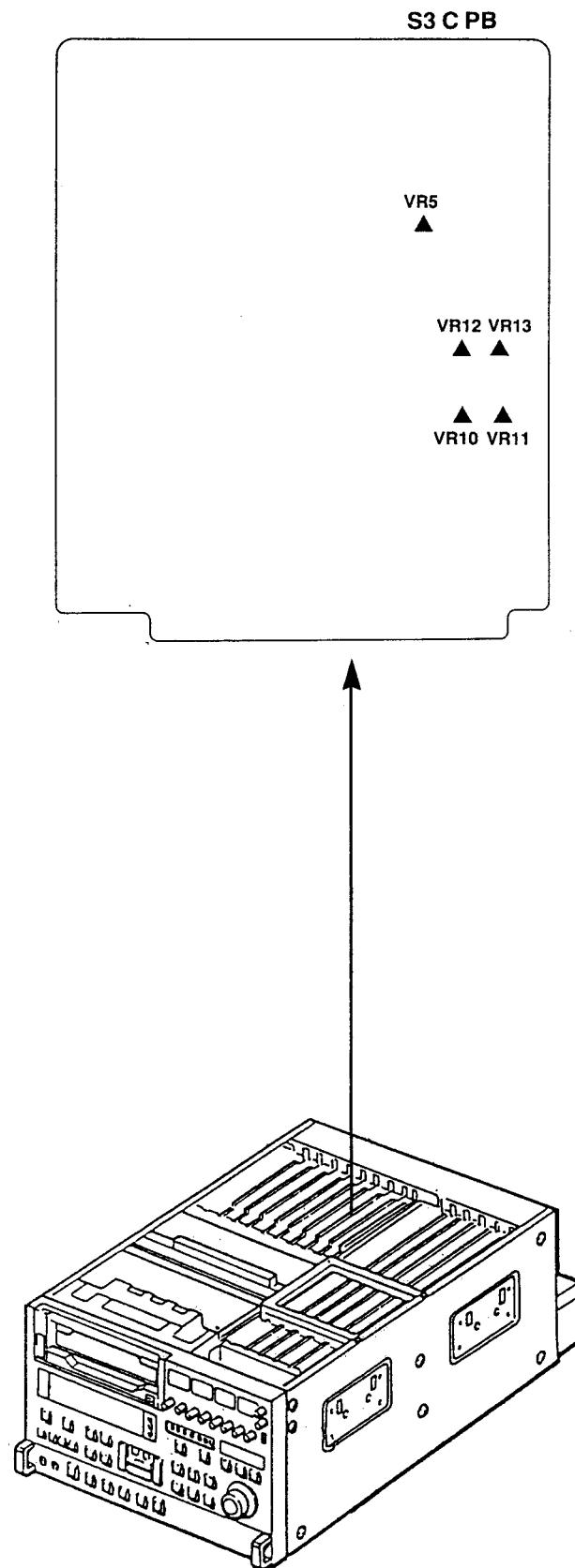


Step 2.

1-28. C PB FREQUENCY RESPONSE ADJ.

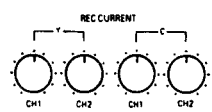
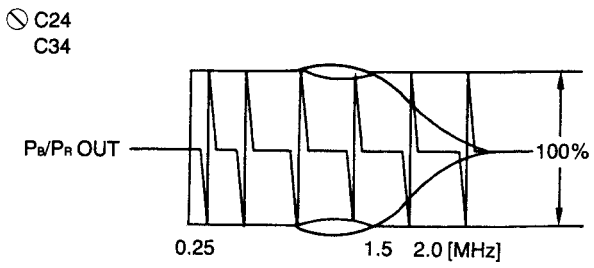
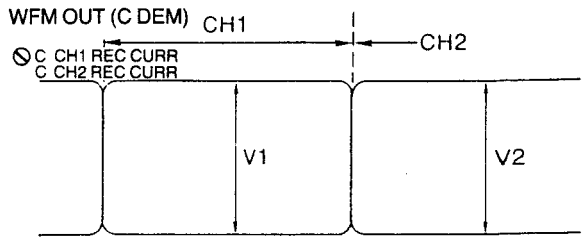
(S3 C PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pb, Pr OUT	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>60% SWEEP PORTION (6min ~ 12min)</div>	WFM MONITOR	-----	VR5 (EQ4) VR10 (EQ1 AT CH1) VR11 (EQ1 AT CH2) VR12 (EQ1 R/P CH1) VR13 (EQ1 R/P CH2)
Step 1. PB EQ SW : MANUAL (Front Sub)					
Step 2. HEAD SELECT : R/P Adjust VR12 (EQ1 R/P CH1) and VR13 (EQ1 R/P CH2) so that the frequency characteristic is in specification.					
Step 3. HEAD SELECT : PLAY Adjust VR10 (EQ1 AT CH1) and VR11 (EQ1 AT CH2) so that the frequency characteristic is in specification.					
Step 4. If the 2MHz portion is not in specification, adjust VR5 (EQ4).					
Step 5. Confirm that the frequency response is in specification.			SPEC for E, OR version REF : 0.5MHz (100%) 1.0MHz : 94 ~ 104% 1.5MHz : 92 ~ 103% 1.8MHz : 91 ~ 102% 2.0MHz : more than 63% SPEC for B version REF : 0.25MHz (100%) 0.25~1.5MHz : 100±5% 2.0MHz : more than 70%		
Note: It is better to cover half of the top while adjusting.					



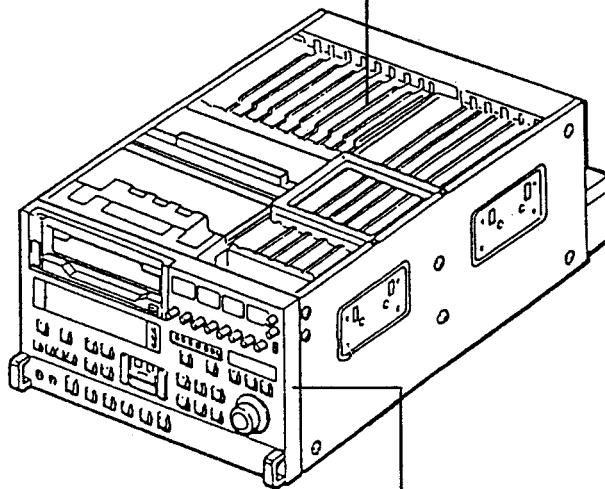
1-29. C REC CURRENT ADJ.

(S5 RF PROCESSOR)

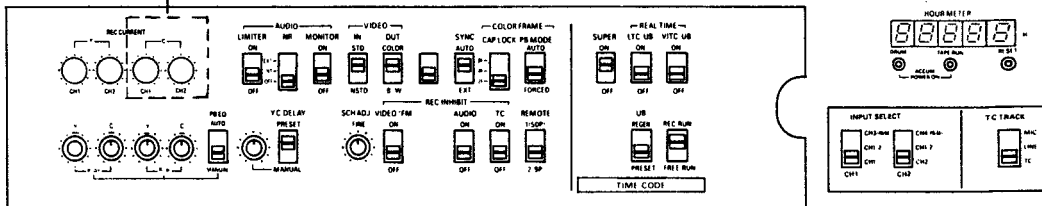
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT												
WFM OUT (C DEM) COMPONENT Pr, Pb OUT	CONFIDENCE PLAYBACK ↓ REC·PLAY	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	COMPONENT 60% SWEEP	C24 C34 C CH1, CH2 REC CURR (Front Sub)												
Step 1. Set C REC CURR VR (Front Sub) to 12:00 o'clock position.																	
Step 2. During recording, adjust C24 and C34 so that the frequency characteristic is in specification.																	
Step 3. Adjust C REC CURR VR (Front Sub) so that the waveform is just before maximum.																	
Step 4. Confirm that the frequency response is in specification. If it is not, readjust the REC CURR.			<table><tr><td>SPEC for E, OR version</td><td>SPEC for B version</td></tr><tr><td>REF : 0.5MHz (100%)</td><td>REF : 0.25MHz (100%)</td></tr><tr><td>1.0MHz : 94 ~ 104%</td><td>0.25MHz~1.5MHz : 100±5%</td></tr><tr><td>1.5MHz : 92 ~ 103%</td><td>2.0MHz : more than 70%</td></tr><tr><td>1.8MHz : 91 ~ 102%</td><td></td></tr><tr><td>2.0MHz : more than 63%</td><td></td></tr></table>			SPEC for E, OR version	SPEC for B version	REF : 0.5MHz (100%)	REF : 0.25MHz (100%)	1.0MHz : 94 ~ 104%	0.25MHz~1.5MHz : 100±5%	1.5MHz : 92 ~ 103%	2.0MHz : more than 70%	1.8MHz : 91 ~ 102%		2.0MHz : more than 63%	
SPEC for E, OR version	SPEC for B version																
REF : 0.5MHz (100%)	REF : 0.25MHz (100%)																
1.0MHz : 94 ~ 104%	0.25MHz~1.5MHz : 100±5%																
1.5MHz : 92 ~ 103%	2.0MHz : more than 70%																
1.8MHz : 91 ~ 102%																	
2.0MHz : more than 63%																	

S3 C PB

C34 C24
▲ ▲



Step 1.



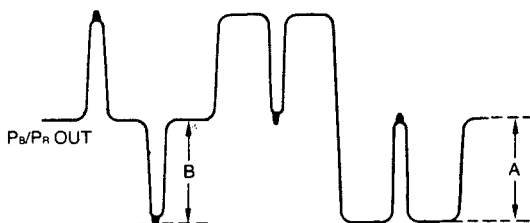
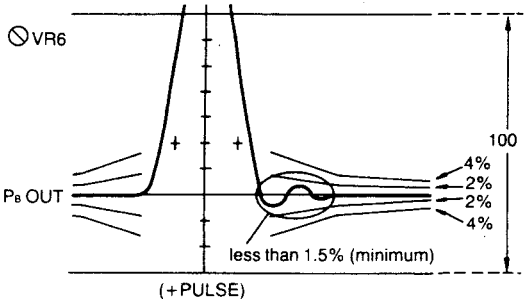
1-30. C MULTI BURST CONFIRMATION

(S3 C PB)

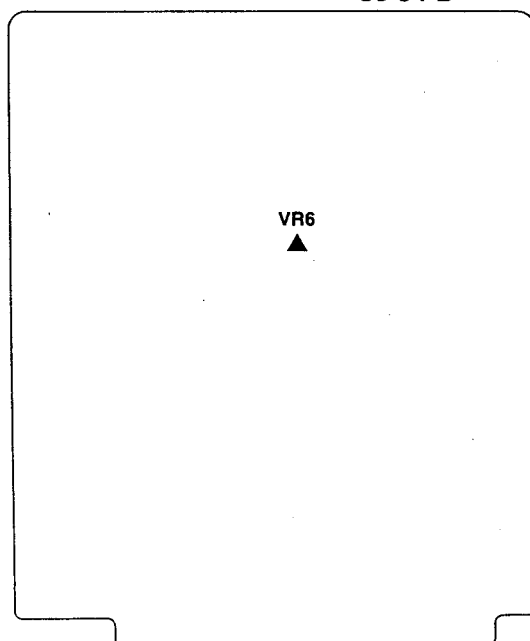
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pr, Pb OUT	SELF RECORDING	<div> <div></div> BLANK <div></div> ALIGNMENT </div>	WFM MONITOR	COMPONENT 60% MULTI BURST	-----
Step 1. MACHINE CONDITION			INPUT SELECT : COMPONENT		
Step 2. HEAD SELECT : R/P Confirm that the 1.5MHz portion (B) and 2MHz portion (C) levels are in specification.			(SPEC for E, OR) D=100%, B=98±3% C=more than 65% (SPEC for B) A=100%, B=100±3% C=more than 75%		
Step 3. HEAD SELECT : PLAY Confirm that the 1.5MHz portion (B) and 2MHz portion (C) levels are in specification.			<p>COMP PB/Pr OUT</p> <p>0.5 1 1.5 2 2.5 [MHz]</p>		

1-31. C K FACTOR ADJ.

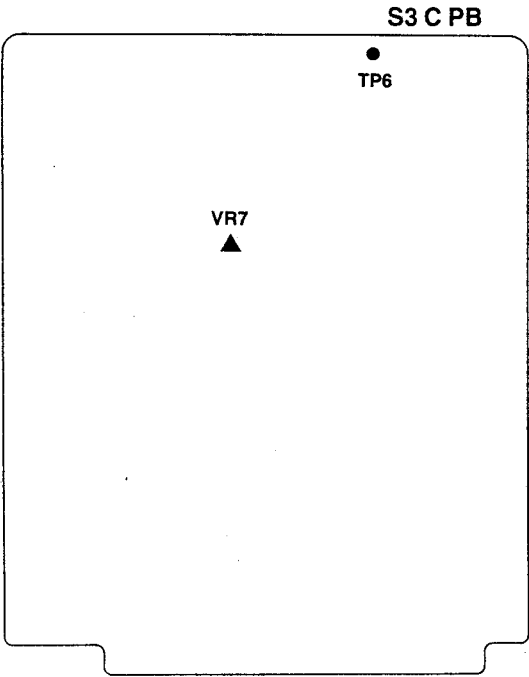
(S3 C PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pr, Pb OUT	SELF RECORDING	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: black; margin-right: 5px;"></div> BLANK <div style="width: 15px; height: 15px; border: 1px solid black; margin-left: 10px; margin-right: 5px;"></div> ALIGNMENT </div>	WFM MONITOR	COMPONENT SIN2 2T PULSE	VR6 (EQ3)
Step 1. Confirm KA of - Pulse			$A=100, B=100 \pm 6$ (KA less than $\pm 1.5\%$) 		
Step 2. Confirm kp of + Pulse					
Step 3. If out of spec → Adjust VR6 (EQ3)			Note 1: If adjust VR6, frequency response confirmation is necessary. Note 2: Measure the centre portion of Noise · Moire while adjusting.		

S3 C PB



TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP6	PLAY	<div><input type="checkbox"/> BLANK</div> <div><input checked="" type="checkbox"/> ALIGNMENT</div> <div>100% COLOUR BAR PORTION (0 ~ 6min)</div>	OSCILLO SCOPE	-----	VR7 (V-V RF LEV)
Adjust VR7 (V-V RF LEV) as shown.			<div><div>TP6</div><div>VR7</div><div>CH1</div><div>CH2</div><div>V1</div><div>V2</div><div>V1=V2=300±30 mVp-p</div></div>		

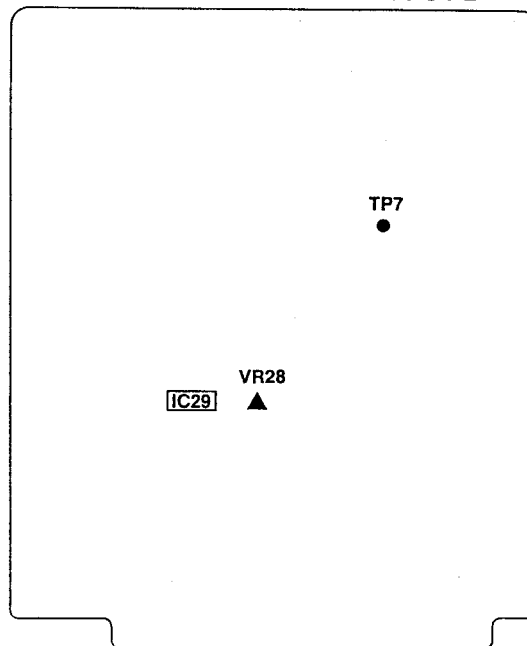


1-33. C AUTO EQ LIMITER ADJ.

(S3 C PB)

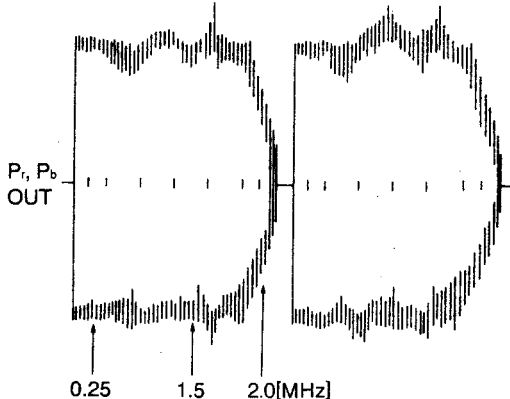
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP7 1 Pin of IC29	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> 60% SWEEP PORTION (6min ~ 12min)	OSCILLOSCOPE	-----	VR28 (AUTO EQ LIM)
<div>Step 1. HEAD SELECT : R/P Connect the scope CH1 to TP7 and CH2 to 1Pin of IC29 and set the scope to DC mode. When changing to PLAY mode from the R/P mode with the HEAD SELECT switch, observe the maximum DC level and minimum DC level at TP7.</div>			<div><div>⊙ VR28</div><div><div><div></div><div></div></div><div>----- IC29-1 pin (Max DC)</div></div><div><div><div></div><div></div></div><div>----- GND</div><div>(R/P) (PLAY)</div></div></div>		
<div>Step 2. Adjust VR28 (AUTO EQ LIM) so that the DC level at 1Pin of IC29 is centred between maximum DC level and minimum DC level at TP7 as shown.</div>					

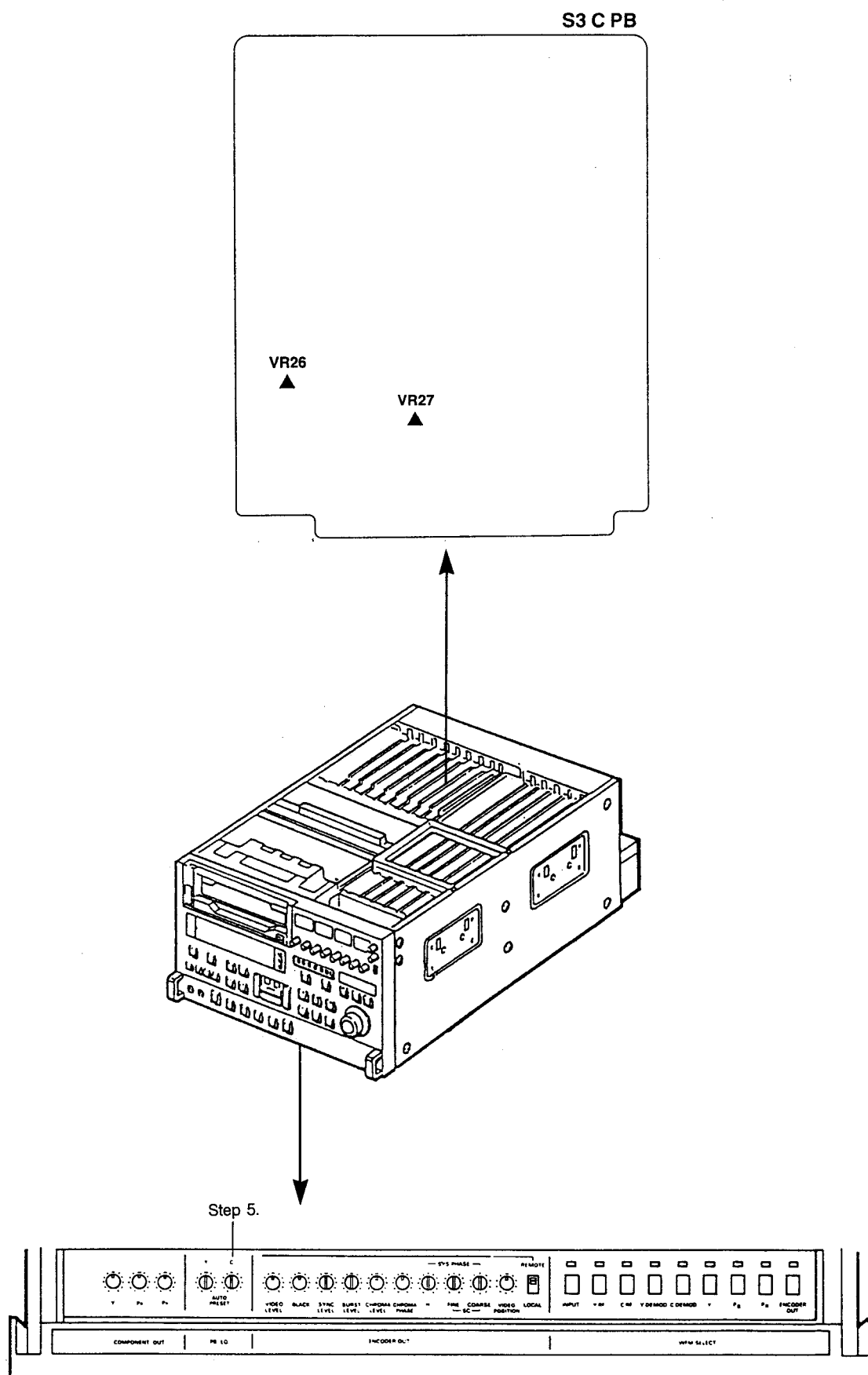
S3 C PB



1-34. C AUTO EQ FREQUENCY ADJ. (1)

(S3 C PB)

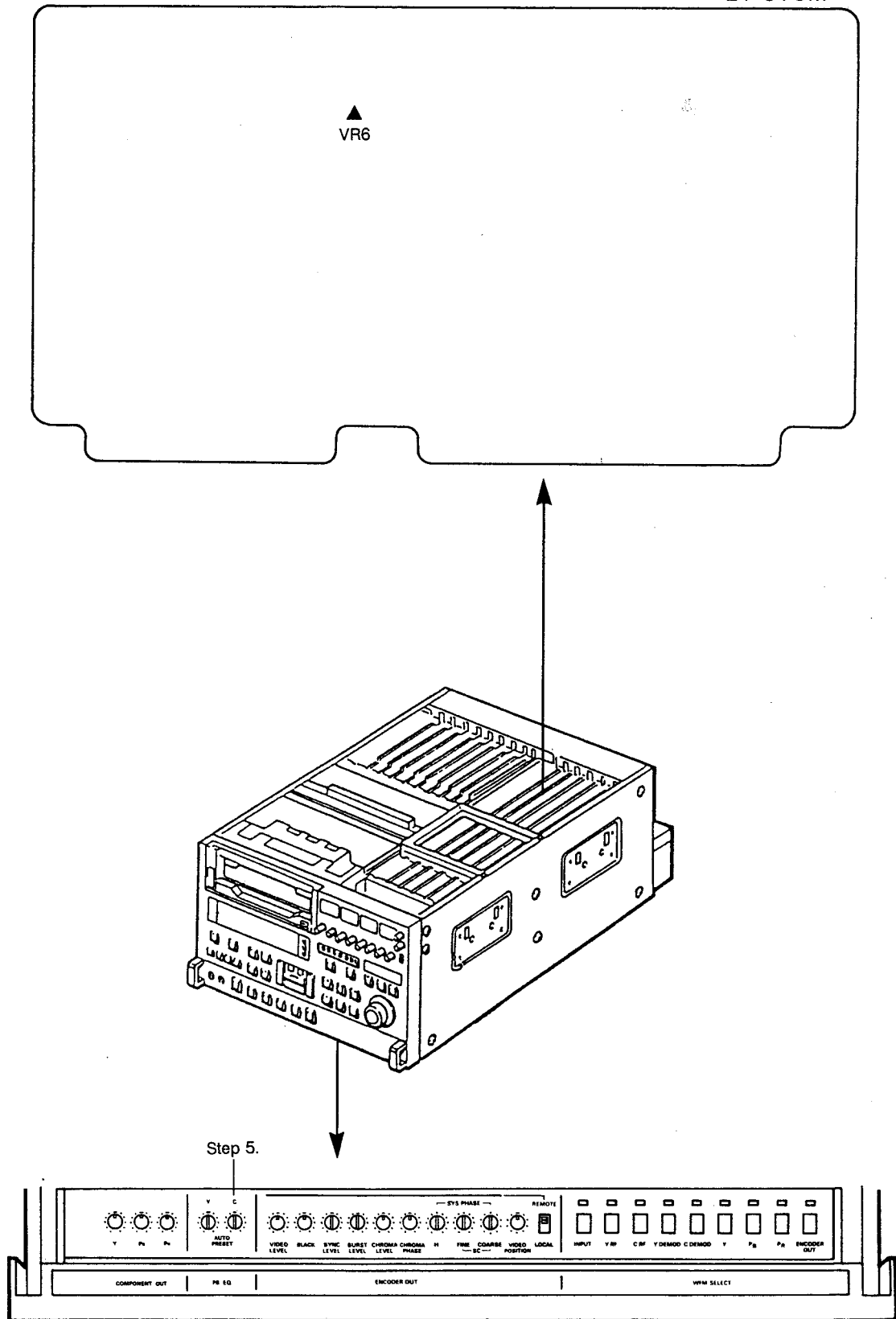
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
Pb, Pr OUT	PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>60% SWEEP PORTION (6min ~ 12min)</div>	WFM MONITOR	-----	VR26 (AUTO EQ PRESET) VR27 (AUTO EQ BAL) C PB EQ VR (Pull out drawer)
Step 1. MACHINE CONDITION			PB EQ SW : AUTO C PB EQ : Centre Click Position (Pull Out Drawer)		
Step 2. HEAD SELECT : R/P Adjust VR27 (AUTO EQ BAL) so that the CH1 and CH2 is balanced as shown.			<div>◎ VR26, VR27, C PB EQ</div> 		
Step 3. Adjust VR26 (AUTO EQ PRESET) so that the frequency characteristic is same as manual EQ as shown.					
Step 4. HEAD SELECT : PLAY Compare the R/P and PLAY head frequency characteristics.					
Step 5. Set the PB EQ switch on the front sub panel to AUTO position and confirm that the frequency characteristic will be changed by smoothly turning the C PB EQ VR on the pull out drawer as shown.			<div><div>SPEC for E, OR version</div><div>REF : 0.5MHz (100%) 1.0MHz : 94 ~ 104% 1.5MHz : 92 ~ 103% 1.8MHz : 91 ~ 102% 2.0MHz : more than 63%</div></div> <div><div>SPEC for B version</div><div>REF : 0.25MHz (100%) 0.25MHz~1.5MHz : 100±5% 2.0MHz : more than 70%</div></div>		



1-35. C AUTO EQ FREQUENCY ADJ. (2)


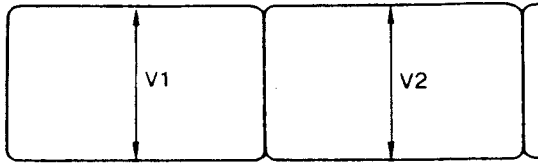

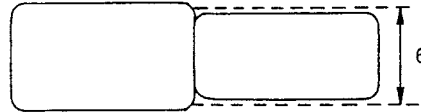
(L4 CTCM)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pb, Pr OUT	SELF/REC ↓ PLAY	■ BLANK □ ALIGNMENT	WFM MONITOR	COMPONENT 60% SWEEP	VR 6 (C BU LEVEL)
Step 1. MACHINE CONDITION			INPUT SELECT : COMPONENT TAPE/EE : TAPE PB EQ SW : AUTO Y PB SW : Centre Click Position (Pull Out Drawer)		
Step 2. HEAD SELECT : R/P Confirm that the frequency response is same as manual EQ.			 SPEC for E, OR Version REF : 0.5MHz (100%) 1MHz : 94 ~ 104% 1.5MHz : 92 ~ 103% 1.8MHz : 91 ~ 102% 2.0MHz : more than 63% SPEC for B Version REF : 0.25MHz (100%) 0.25MHz ~ 1.5MHz : 100±5% 2.0MHz : more than 70%		
Step 3. If it is not, slightly adjust VR6 so that the frequency response is same as manual EQ as shown.					
Step 4. HEAD SELECT : PLAY Confirm that the frequency response is same as manual EQ.					
Step 5. Set the PB EQ switch on the front sub panel to AUTO position and confirm that the frequency response will be changed by smoothly turning the C PB EQ VR on the pull out drawer.					

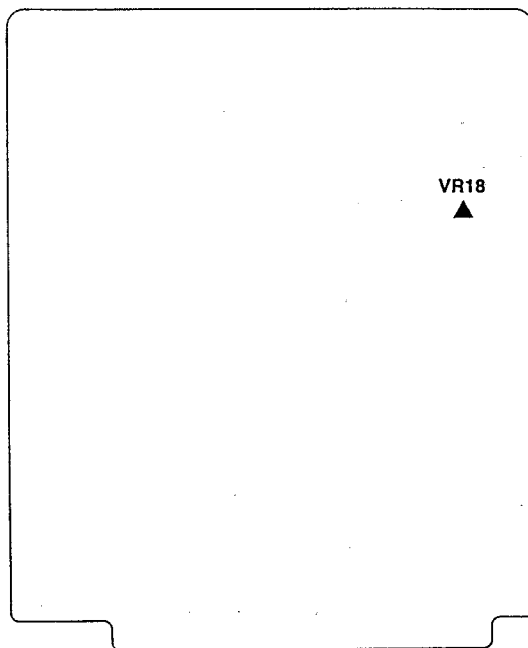


1-36. C WFM RF LEVEL ADJ.

(S3 C PB)

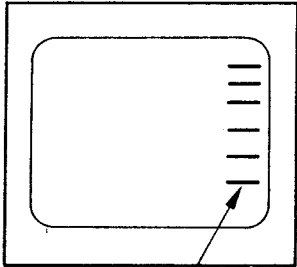
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
WFM OUT (C RF)	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 100% COLOUR BAR PORTION (0 ~ 6min)	OSCILLO SCOPE	-----	VR18 (WFM RF LEV)
Step 1. Adjust VR18 (WFM RF LEV) as shown.			TP3  VR18 <div> <div>CH1</div> <div>CH2</div> <div>  </div> </div> $V1 = V2 = 600 \text{ mVp-p} \pm 30 \text{ mVp-p}$		
Step 2. If there is a channel difference, RF level should be adjusted at average level between CH1 and CH2.			 VR18 <div> <div>WFM OUT</div> <div>  </div> </div>		

S3 C PB



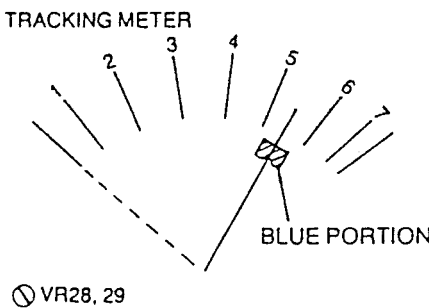
1-37. C OVER MODULATION CONFIRMATION

(S3 C PB)

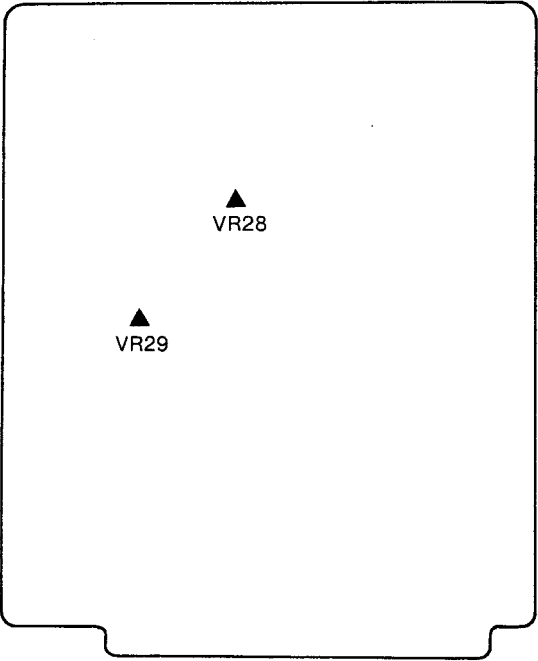
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
COMPONENT Pb, Pr OUT	SELF REC/PLAY	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	TV MONITOR	100% SWEEP	-----
Step 1. Confirm that the overmodulation is not appeared on the monitor.			<div style="text-align: center;"> <p>MONITOR</p>  <p>Overmodulation Noise</p> </div>		
Step 2. If overmodulation appears, head erase or EQ re-adjustment is necessary.					

1-38. TRACKING METER ADJUSTMENT

(S4 Y PB)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TR METER	EJECT ↓ PLAY	<div><input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT</div> <div>100% COLOUR BAR PORTION (0 ~ 6min)</div>	-----	-----	VR28 (RF METER LEV) VR29 (RF METER ZERO)
Step 1. MACHINE CONDITION			METER SELECT : TRACKING TRACKING VR : CENTRE DETENT TAPE/EE : TAPE		
Step 2. Adjust VR29 (RF METER ZERO) so that the tracking meter indicates 0.			<div>TRACKING METER</div> <div></div>		
Step 3. 1. Play back the colour bar portion of Alignment tape. 2. Adjust VR28 (RF METER LEV) so that the tracking meter indicates blue portion.					

S4 Y PB

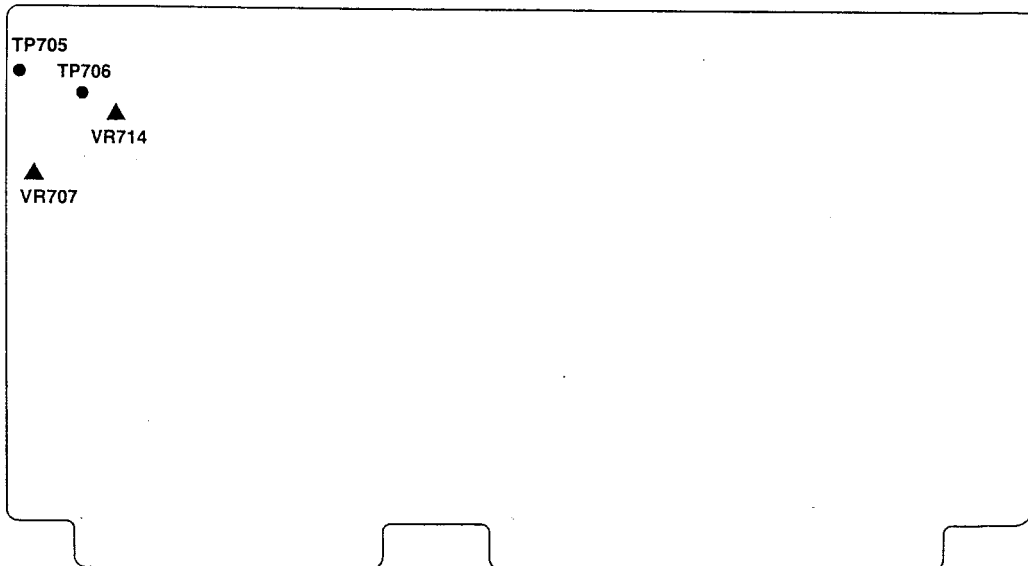


1-39. FM CARRIER ADJ.

(L4 FM AUDIO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP705 TP706	RECORDING	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	FREQUENCY COUNTER	DO NOT SUPPLY ANY SIGNAL	VR707 (CH3 CARR) VR714 (CH4 CARR)
Step 1. MACHINE CONDITION			Pull the REC VR (CH3, CH4) on the front panel and turn it fully counter clockwise.		
Step 2. Connect the frequency counter to TP705.			Adjust VR707 (CH3 CARR) to 400KHz (\pm 5KHz).		
Step 3. Connect the frequency counter to TP706.			Adjust VR714 (CH4 CARR) to 700KHz (\pm 5KHz).		

L4 FM AUDIO

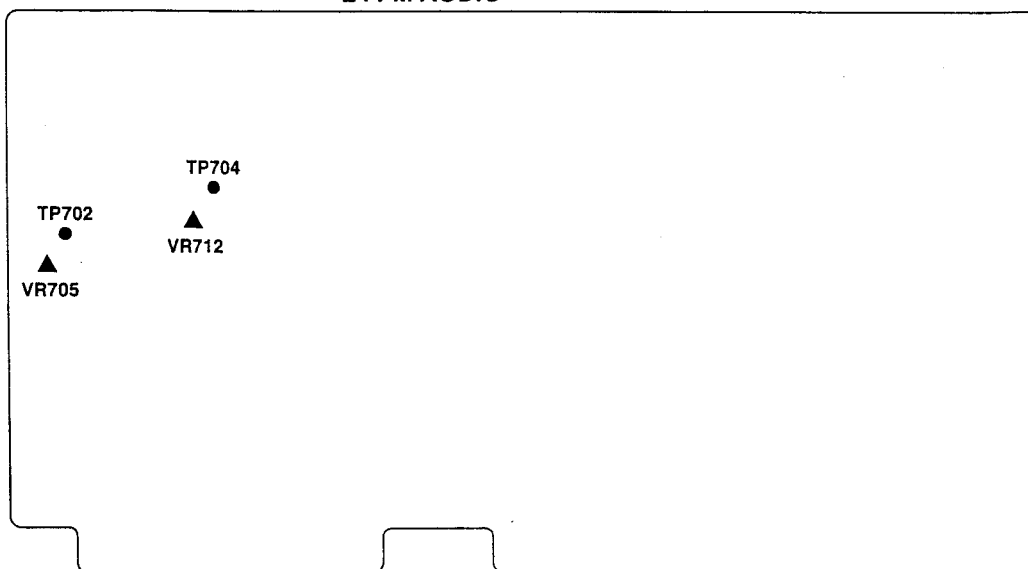


1-40. PLAYBACK LEVEL ADJ.

(L4 FM AUDIO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP702 TP704	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 1KHz OVU PORTION (0 ~ 6min)	VTVM	-----	VR705 (CH3 PB LEVEL) VR712 (CH4 PB LEVEL)
Step 1. MACHINE CONDITION			TRACKING VR : Centre detent position (Front Sub) HEAD SELECT : R/P		
Step 2. Connect the VTVM to TP702.			Adjust VR705 (CH3 PB LEVEL) to -22dBV (± 0.2 dB) (0.08Vrms, 0.22Vp-p)		
Step 3. Connect the VTVM to TP704.			Adjust VR712 (CH4 PB LEVEL) to -22dBV (± 0.2 dB). (0.08Vrms, 0.22Vp-p)		

L4 FM AUDIO

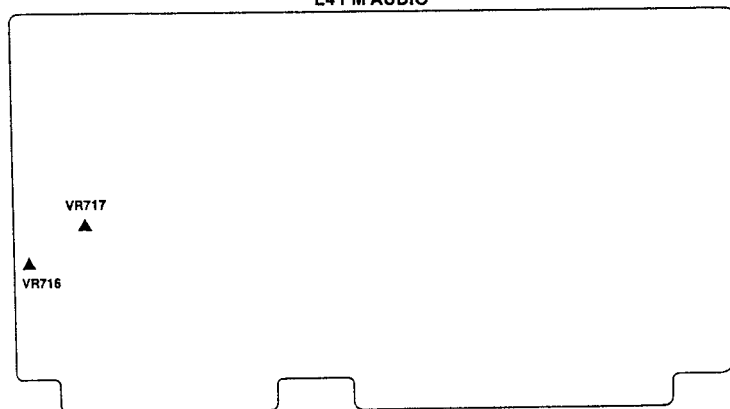


1-41. PLAYBACK OUTPUT LEVEL ADJ.

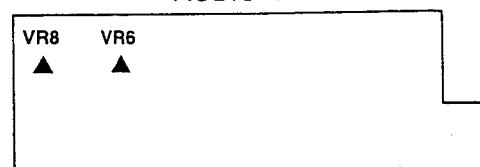
(L4 FM AUDIO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH3, CH4 LINE OUT	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 1KHz OVU PORTION (0 ~ 6min)	VTVM	-----	VR716 (CH3 PB OUT) VR717 (CH4 PB OUT) VR 6 (CH3 PB) VR 8 (CH4 PB) (both on the AUDIO VR P.C.B.)
Step 1. MACHINE CONDITION			OUTPUT ATT SW : MID TRACKING VR : Centre detent position		
Step 2. Pull the CH3 and CH4 play back level controls on the front panel and place in their centre position.					
Step 3. Connect the VTVM to CH3 LINE OUT.			Adjust VR716 (CH3 PB OUT) to 0dBm.		
Step 4. Connect the VTVM to CH4 LINE OUT.			Adjust VR717 (CH4 PB OUT) to 0dBm.		
Step 5. Push in the CH3 and CH4 play back level controls.					
Step 6. Connect the VTVM to CH3 LINE OUT.			Adjust VR6 (CH3 PB) on the audio VR Board to + 0dBm. (0.774Vrms, 2.19Vp-p)		
Step 7. Connect the VTVM to CH4 LINE OUT.			Adjust VR8 (CH4 PB) on the audio VR Board to + 0dBm. (0.774Vrms, 2.19Vp-p)		

L4 FM AUDIO



AUDIO VR

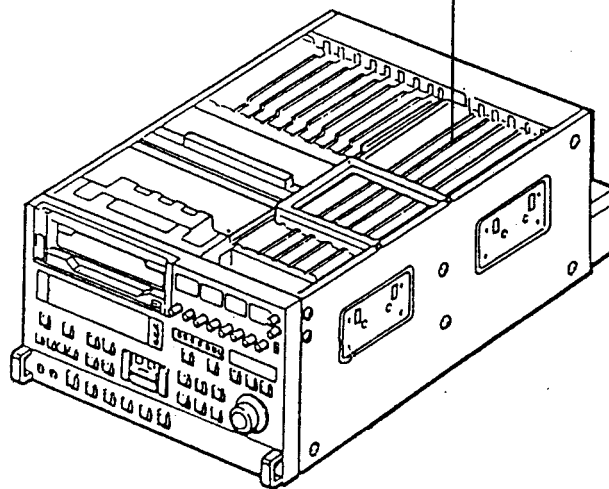
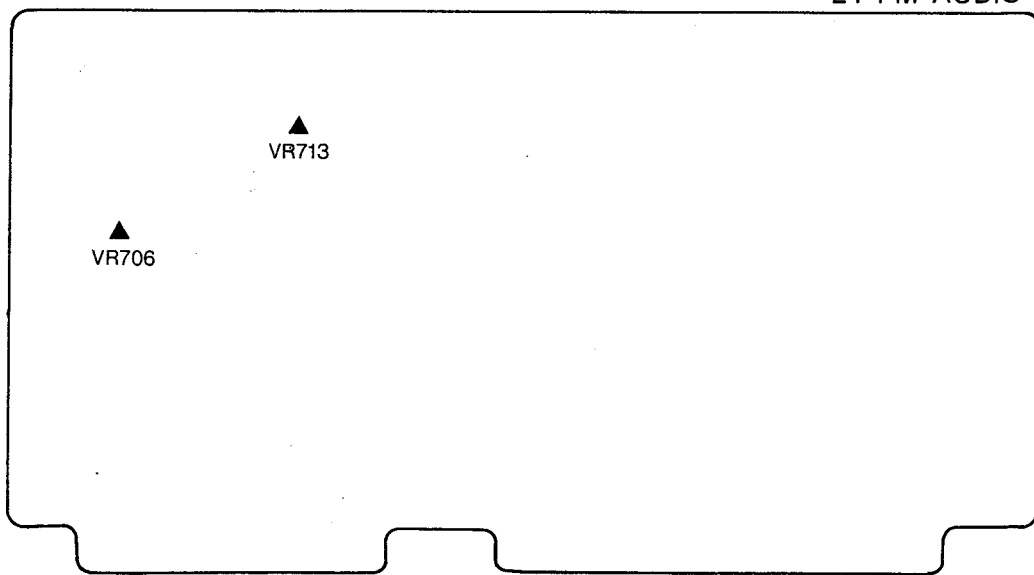


1-42. DEVIATION ADJUSTMENT

(L4 FM AUDIO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH3, CH4 LINE OUT	SELF RECORDING	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	VTVM	1KHz 0dBm	VR706 (CH3 DEV) VR713 (CH4 DEV)
Step 1. MACHINE CONDITION			CH3, CH4 Record level VR : Push in INPUT ATT : MID		
Step 2. Recording mode → Play mode Connect the VTVM to CH3, CH4 LINE OUT			Measure the different level between 0dBm and CH3, CH4 output level.		
Step 3. Recording mode. Connect the VTVM to TP717			Adjust VR706 (CH3 DEV) to CH3/2 dB.		
Step 4. Recording mode. Connect the VTVM to TP718.			Adjust VR713 (CH4 DEV) to CH4/2 dB.		
Step 5. Repeat steps 3 and 4 until the output signal at LINE OUT to 0dBm \pm 0.2dBm. (0.74Vrms, 2.19Vp-p).					

L4 FM AUDIO



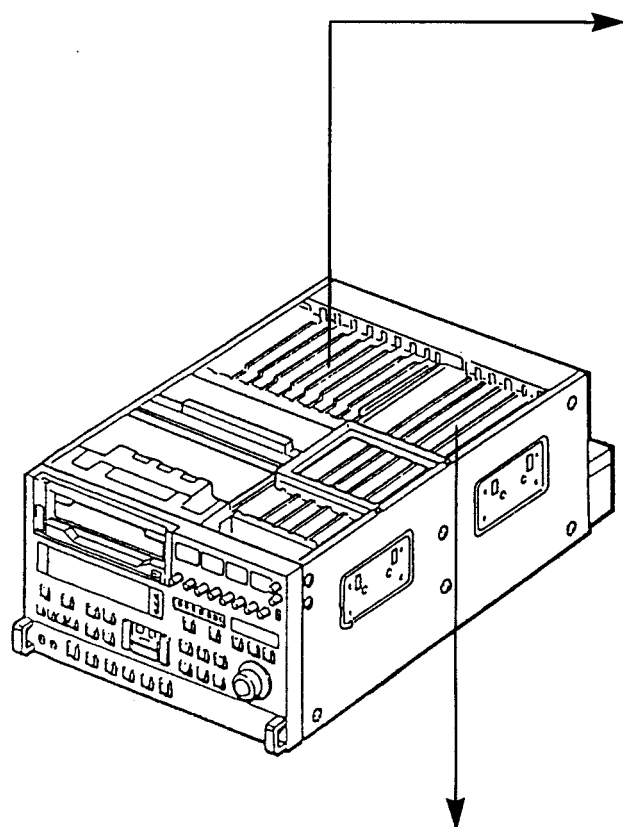
1-43. REC CURRENT ADJ.

(L4 FM AUDIO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP4 (S5)	SELF RECORDING ↓ PLAY	■ BLANK □ ALIGNMENT	SPECTRUM ANALYZER	VIDEO : 50% FLAT FIELD FM AUDIO : DO NOT SUPPLY ANY SIGNAL	VR708 (REC CURR) VR718 (CURR MIX)
<p>Note:</p> <p>C rec current adjustment and C recording frequency response adjustment must be completed before this adjustment.</p>					
<p>Step 1.</p> <p>Set the spectrum analyzer.</p>			<p>CENT FREQ : 6.2MHz FREQ SPAN : 15MHz SWEEP TIME : 110ms SWEEP/TRIGGER : EXT CONT START TRACE : WRITE</p>		
<p>Step 2.</p> <p>Connect the spectrum analyzer to TP4 on the REC AMP Board.</p>			<div><p>LEVEL ↑</p><p>(dB)</p><p>TP4 (S5) ∅ VR708, VR718</p><p>0.4M 0.7M 6.2 M</p><p>(CH3) (CH4)</p><p>f (Hz)</p></div>		
<p>Step 3.</p> <p>Confirm that the carrier level of FM Audio is -20 ±0.3dB lower than the chroma carrier level as shown figure.</p>					
<p>Step 4.</p> <p>If it is not, place the unit in the record mode and adjust VR708 (REC CURR) and VR718 (CURR MIX).</p>					

S5 RF PROCESSOR

TP4
●



L4 FM AUDIO

VR708
▲

VR718
▲

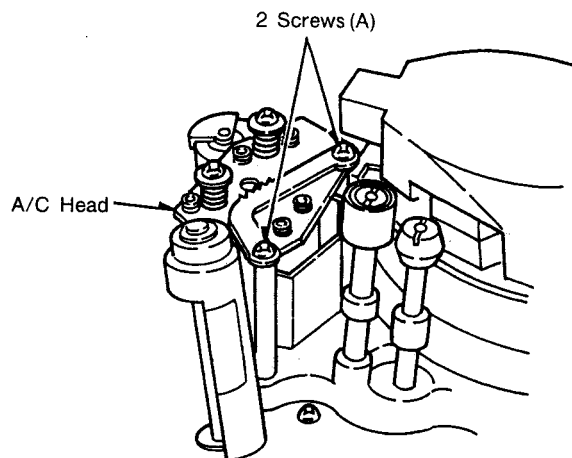
2. A/C HEAD REPLACEMENT AND ADJUSTMENT

REPLACEMENT

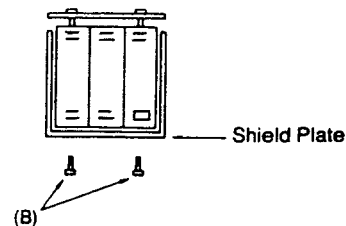
REMOVAL

1. It will be necessary to move the pinch roller from in front of the A/C head to aid replacement. The software has a program that will move the loading ring sufficiently CCW to allow cleaning and replacement. Without a tape, press any two of the three buttons above the search dial simultaneously. To exit this mode, hit "EJECT" or power off.
2. Remove the 2 screws (A) as shown in figure 2-1.
3. Remove the A/C Head assembly.
4. Remove the shield plate by removing two screws (B). (Fig. 2-2)
5. Unsolder head wires. (When unsolder head wires, do not unsolder all at the same time)

(Fig. 2-1)



(Fig. 2-2)

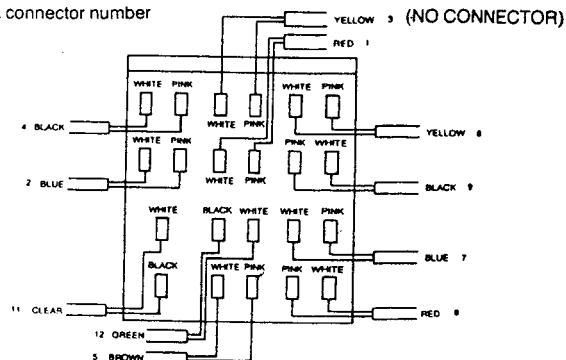


INSTALLATION

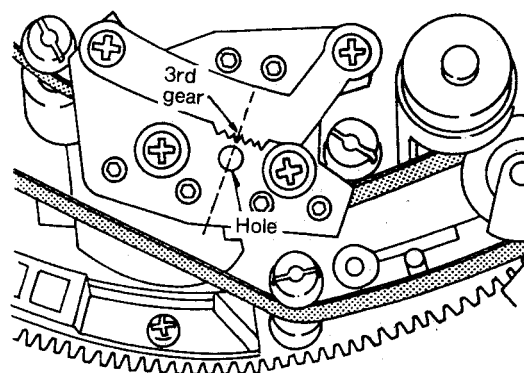
1. Solder leads as necessary. (refer to wiring drawing as shown in figure 2-3)
2. Reinstall the shield plate onto the A/C head assembly.
3. Install the new A/C head and tighten the two screws (A) and (B).
4. Clean the surface of the A/C head.
5. After installation, the 3rd gear of install plate should be set to the centre of the hole as shown in figure 2-4.

(Fig. 2-3)

Each number is a connector number



(Fig. 2-4)



ADJUSTMENT

Tools Required :

Alignment tape
Hex Screw (1.27mm)

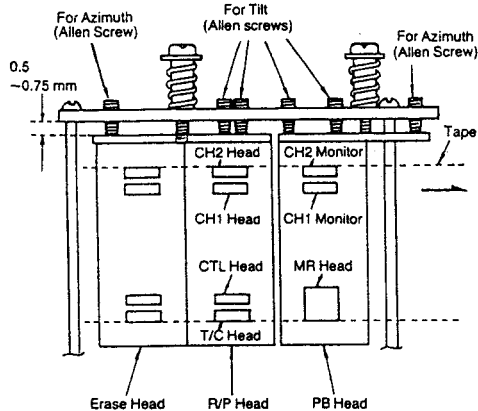
A/C HEAD

The A/C Head is held in a vertical position by 6 Hex Screws and screws (G) and (H). The 2 Screws (C) pass through 2 plain holes in the mounting plate and screw into 2 tapped holes in the top plate of the A/C Head. The 6 Hex Screws (A - F) fit into tapped holes in the mounting plate and their lower ends bear on the top of the head. These screws serve to tilt by screws (B), (E) and azimuth by screws (A), (D) (for coarse) and (G), (H) (for fine) the head in a plane orthogonal to the tape path. When raising or lowering the A/C Head all 6 screws must be adjusted at the same time, and slightly tighten the 2 screws (G) and (H) to keep snug enough to maintain spring tension between head and hex screws (Fig. 2-5).

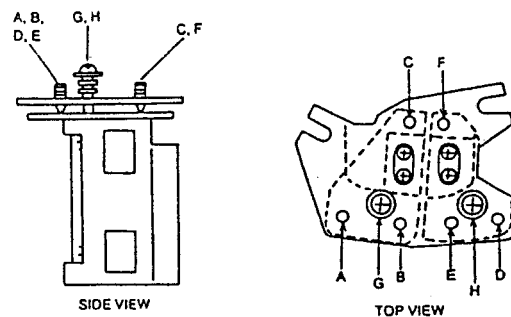
Purpose of each screws (A - H)

- A : Coarse Azimuth adjustment for R/P head.
- B : Height and tilt adjustment for R/P head.
- C : Tilt and height adjustment for R/P head.
- D : Coarse Azimuth adjustment for PLAY head.
- E : Height and tilt adjustment for PLAY head.
- F : Tilt and height adjustment for PLAY head.
- G : Spring tension and fine azimuth adjustment for R/P head. (Keep tension)
- H : Spring tension and fine azimuth adjustment for PLAY head. (Keep tension)

(Fig. 2-5)



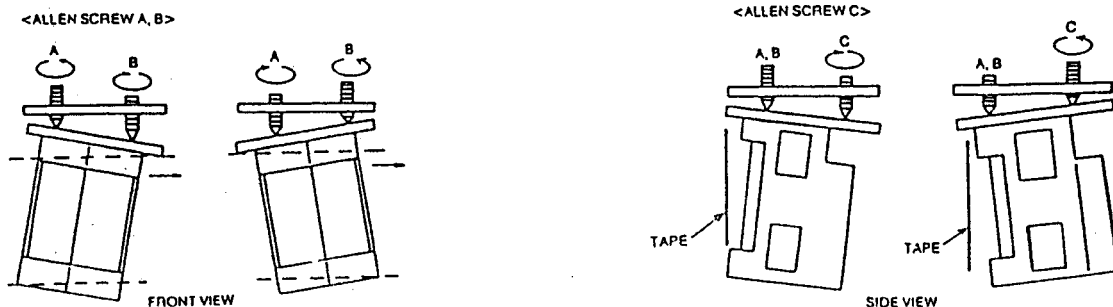
(Fig. 2-6)



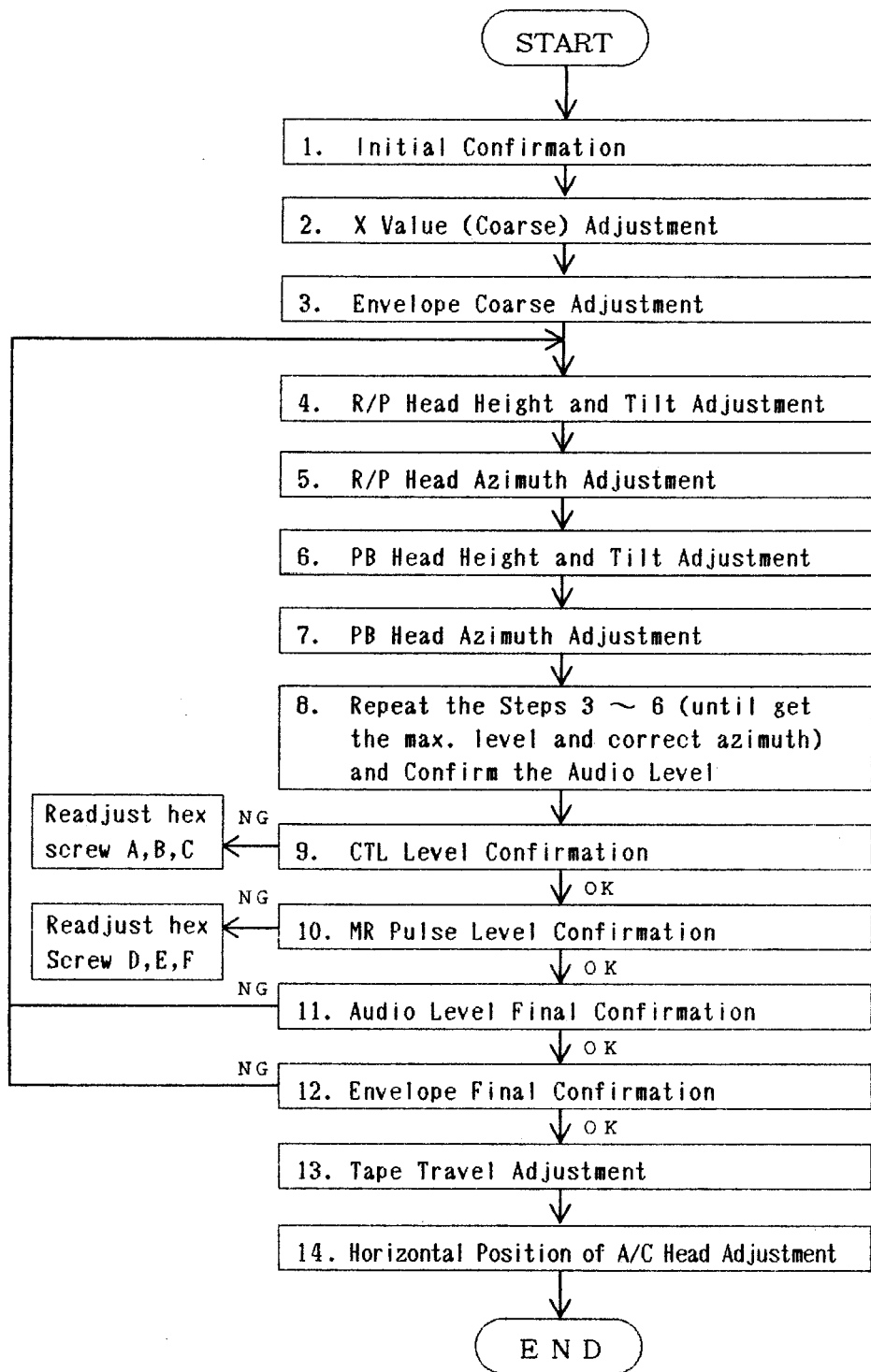
Hex screw (A - F) function.

Ex. R/P Head :

(Fig. 2-7)



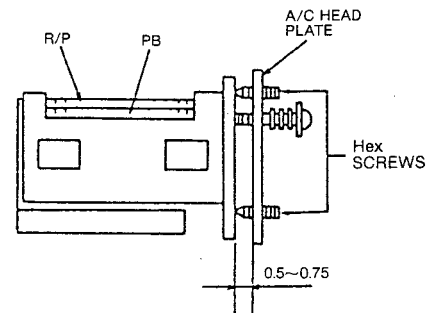
A/C Head Mechanical Adjustment Flow Chart



1) A/C HEAD INITIAL ADJUSTMENT

1. Adjust the each hex screw so that the separation between head top-plate and head mounting plate is set to be between 0.5 and 0.75 mm with the plate parallel.
2. Confirm that the R/P head and PLAY head is the same height viewed from the side as shown in figure 2-8.

(Fig. 2-8)



2) ENVELOPE COARSE ADJUSTMENT

Note :

Tension adjustment completely performed.

1. Connect the scope CH1 to WFM C RF out and CH2 to TP46 on L5 SERVO to trigger the scope.
2. Playback the linearity portion of the alignment tape.
3. In order to achieve a flat envelope, turn hex screw (C) to CW so that the CTL head touches the CTL track and servo is locked. At that time, set the envelope is maximum at Tracking Meter by adjusting Tracking VR.
4. Confirm that the tape is not deformed at P5 and P6.

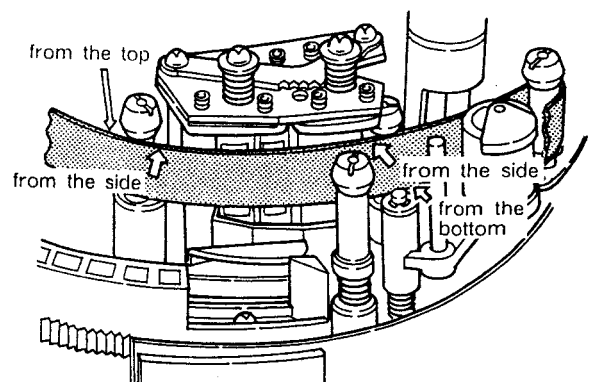
3) R/P HEAD HEIGHT AND TILT ADJUSTMENT

After making a flat envelope, audio maximum level adjustment is necessary

1. Connect the WFM monitor to WFM OUT (C RF) and connect the scope CH1 and CH2 to Audio out CH1 and CH2 on the rear panel. (SW1 on the S6 Board is select switch for R/P Head out or PB Head out)
2. Playback the 3KHz portion of the alignment tape (26-31min). At that time, confirm that there is no tape deforming on P5 and P6.
3. Confirm the audio output accordance with following procedure.

- 3-1. Push gently on the tape upper edge at P5 entrance side as shown in figure 2-9 and check the envelope and audio level accordance with the procedure chart on next page.

(Fig. 2-9)



Adjustment Procedure Chart

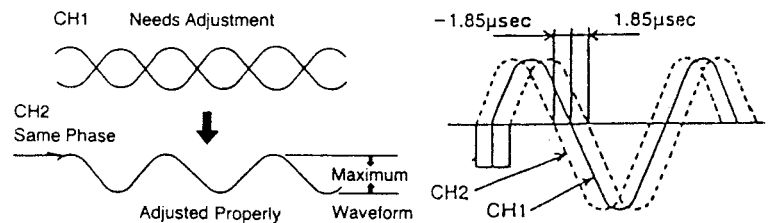
Post	Pushing Part	Reasons	Adjustment
P5 (Head for R/P)	from the top	A/C Head is lower position from the audio track. It is necessary to adjust the height.	Loosen 3 hex screws A,B,C as same order.
	from the side	A/C Head does not touch the tape correctly. It is necessary to adjust the tilt.	Loosen hex screw C and tighten hex screw B.
P6 (Head for PB)	from the bottom	A/C Head is higher position from the audio track. It is necessary to adjust the height.	Tighten 3 hex screws D,E,F as same order.
	from the side	A/C Head does not touch the tape correctly. It is necessary to adjust the tilt.	Loosen hex screw F and tighten hex screw Z.
P2 (for Final conf.)	P2 arm (refer to Fig. 2-12)	A/C Head tilt is incorrect. It is necessary to adjust the tilt.	Loosen hex screw C,F and tighten hex screws A,B,D,E as same order.

※ Hight fixed screws should be loosen as needed.

4) R/P Head Azimuth Adjustment

1. Playback the 15KHz portion of alignment tape (31min-35min).
2. Confirm the audio level CH1 and CH2 are maximum.
3. Adjust hex screw (A) so that the both phase are same (within 1.85 usec) as shown in figure 2-10.

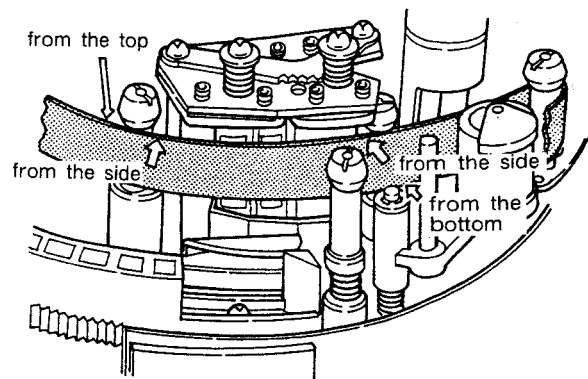
(Fig. 2-10)



5) PB HEAD HEIGHT AND TILT ADJUSTMENT

1. Playback the 3KHz portion of alignment tape (26-31min).
2. Confirm that there is no tape deforming on P5 and P6.
3. Confirm the audio output accordance with following procedure .
 - 3-1. Push gently on the tape upper edge at P6 exit side as shown in figure 2-9 and check the envelope, audio level accordance with procedure chart above.

(Fig. 2-9)



6) PB HEAD AZIMUTH ADJUSTMENT

1. Playback the 15KHz portion of the alignment tape. (31-35min)
2. Confirm that the audio CH1 and CH2 are maximum.
3. Adjust hex screw (D) so that the both phase are same (within 1.85 usec) as shown in figure 2-10.

7) CTL LEVEL CONFIRMATION

1. Connect the scope to TP10 on the L5 SERVO P.C.Board.
2. Playback the linearity portion of the alignment tape.
3. Confirm the CTL pulse is more than 1.2Vp-p as shown in figure 2-11.
4. If it is not, readjust the hex screws A-C.
5. After readjustment, audio peak maximum level confirmation is necessary.

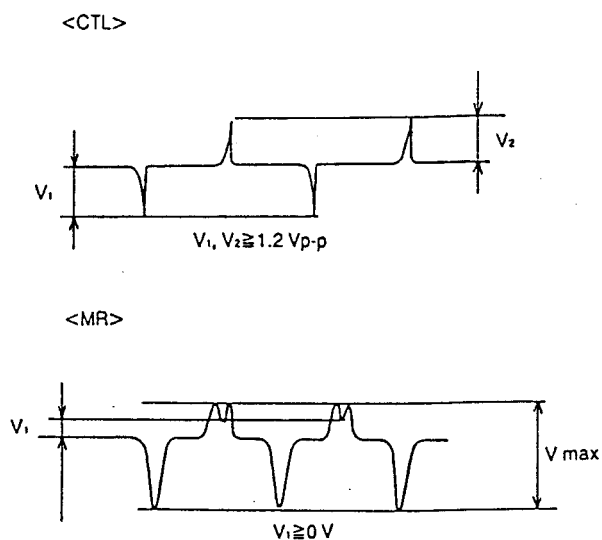
8) MR PULSE LEVEL CONFIRMATION

1. Connect the scope to TP103 on the L5 SERVO P.C.Board.
2. Playback the 3KHz portion of the alignment tape.
3. Confirm the MR pulse level is maximum as shown in figure 2-11.
4. If it is not, readjust the hex screws D-F.
5. After readjustment, audio peak maximum level confirmation is necessary.

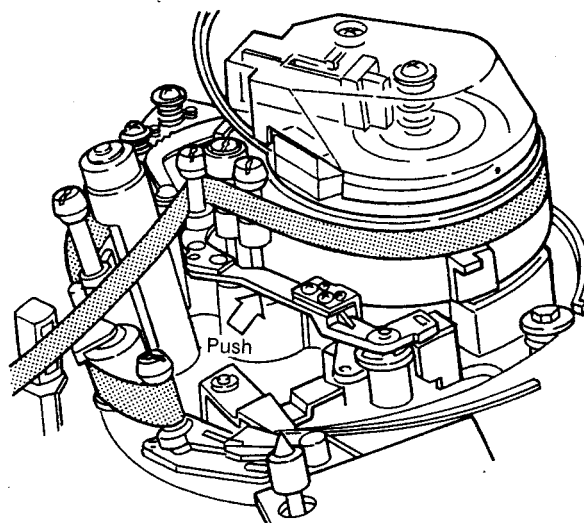
9) AUDIO LEVEL FINAL CONFIRMATION

1. Playback the 15KHz portion of the alignment tape.
2. Push gently on the tape edge at P5 entrance side and P6 exit side.
3. If audio level is increased, readjust hex screws A-F accordance with the adjustment procedure chart.
4. Push gently on the P2 arm as shown in figure 2-12.
5. If audio level is increased, readjust hex screws accordance with the adjustment procedure chart.

(Fig. 2-11)



(Fig. 2-12)



10) ENVELOPE FINAL CONFIRMATION

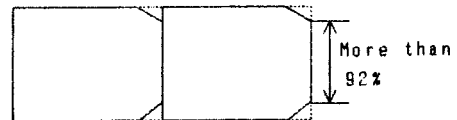
1. Playback the linearity portion of the alignment tape (26-35min) and observe the C RF at WFM out.
2. Confirm that the C RF envelope is within the following specification as shown in figure 2-13.

(Fig. 2-13)

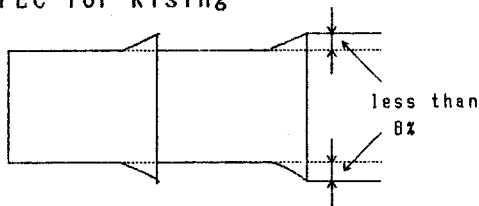
REF : Flat envelope



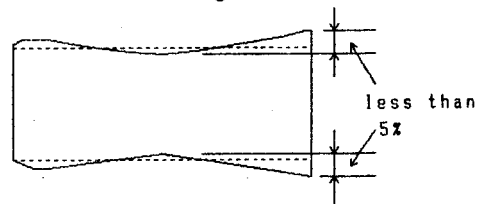
SPEC for Falling



SPEC for Rising



SPEC for Waving



11) TAPE TRAVEL ADJUSTMENT (after A/C head adjustment)

1. After the A/C head adjustment has been completed, observe the lower flange of the P6 post during playback. The bottom edge of the tape should just touch the lower flange of the P6 post. If not, adjust the height of the P6 post.

Note:

When the P5 and P6 post have to be readjusted due to tape curling or waving, always recheck the playback RF envelope, A/C head height, tilt, and azimuth.

2. After confirmation or adjustment of the P6 post, place the unit in the reverse playback mode. Make sure that the bottom edge of the tape just touches the lower flange of the P6 post without tape curling. If tape curling occurs at the bottom flange of the P6 post, lower both P8 and P9 post slightly, then lower the P7 post until the tape curling disappears.
3. In the REV x1 playback mode, if tape curling is seen at the lower edge of the P8 post, then raise the P9 post as needed.
4. In all modes (FORWARD x1 to x32 REVERSE x1 to x32) tape curling should not occur at the flanges of the P6, P7, P8, and P9 posts. Readjust as needed if tape curling should occur.
5. Position P11 and P12 so that the tape path is in the middle of these post.

Note:

Make sure that all hex screws on the post are tightened securely.

12) HORIZONTAL POSITION OF A/C HEAD ADJUSTMENT

Tools Required :

Fine Adjustment Screwdriver (VFK0446)

Eccentric Screwdriver (VFK0357)

Alignment Tape

Note:

Before this adjustment is performed, envelope output, A/C head height and azimuth, and Y PB RF LEVEL adjustments should be confirmed or completed.

(Refer to Y PB RF LEVEL electrical adjustment)

Y PB RF LEVEL ADJUSTMENT (Electrical)

Board : Y PB (S4)

Test Point : TP3

Adjustments : VR1 (R/P RF LEVEL)

VR2 (AT RF LEVEL)

1. Play back the colour bar portion of alignment tape.
2. Set the HEAD SELECT switch to R/P position.
3. Connect the scope to TP3 and adjust VR1 (R/P RF LEVEL) to 300mVp-p \pm 30mVp-p. (Fig. 2-14)
4. Set the HEAD SELECT switch to PLAY position and adjust VR2 (AT RF LEVEL) to 300mVp-p \pm 30mVp-p. (Fig. 2-14)

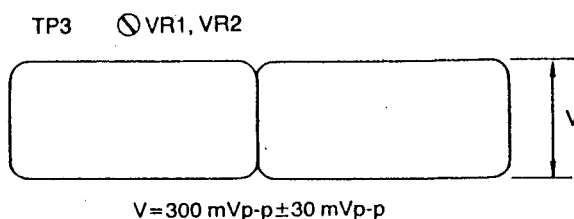
HORIZONTAL POSITION ADJUSTMENT (Mechanical)

1. Insert the alignment tape, and play back the Field Skip portion. (23-26min)
2. Set the tracking control on the front panel to the detent position.
3. Connect CH1 of the oscilloscope to WFM OUT and CH2 to AUDIO CH2 OUT on the rear panel.
4. Select Y RF with the WFM SELECT on the pull out drawer.
5. Loosen the 2 screws (A) a 1/4 of a turn and insert the eccentric adjustment screwdriver into hole (B) as shown in figure 2-15.
6. Adjust the A/C head assemble by turning the eccentric adjustment screwdriver to make the envelope level maximum, and the skip portion in the same position as shown in figure 2-16.
7. If the skip portion is shifted causing by CTL head incorrect position, readjust the A/C head. (After that, audio level confirmation is necessary.)
8. Tighten the 2 screws (A) alternately with small order.

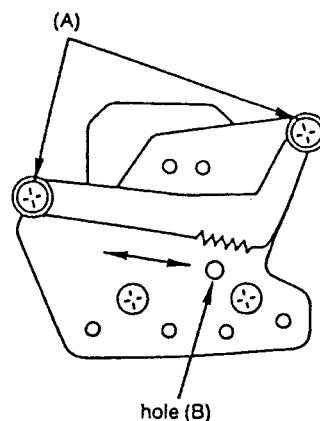
Note:

After this adjustment, confirm the envelope output, height, and azimuth adjustment of the A/C head.

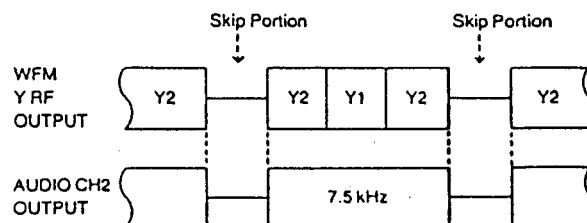
(Fig. 2-14)



(Fig. 2-15)

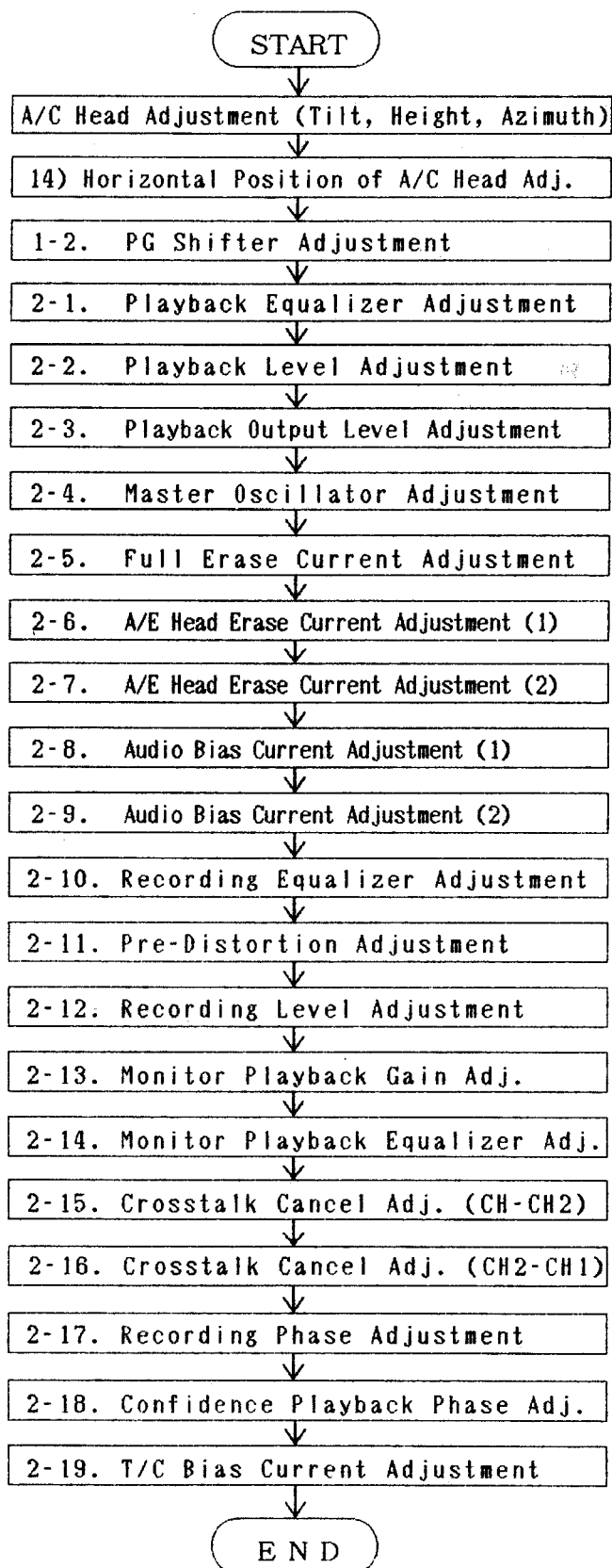


(Fig. 2-16)



ADJUSTMENT

Perform electrical checks and adjustments according to the following flow chart.



MACHINE CONDITION of AUDIO ADJUSTMENT

· Following switch setting are necessary when adjust the audio section unless otherwise designated.

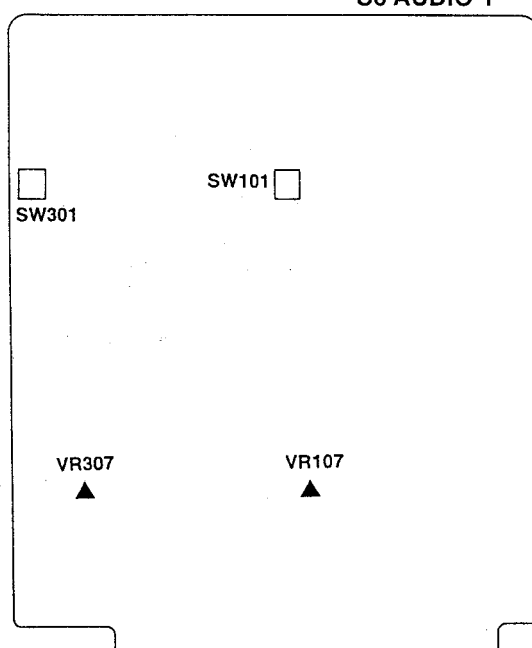
INPUT SELECT SW (Front Sub)	:	CH1
TC TRACK SW (Front Sub)	:	TC
AUDIO LIMITER SW (Front Sub)	:	OFF
AUDIO NR SW (Front Sub)	:	OFF
INPUT ATT SW (S7 AUDIO 2)	:	MID (Centre)
OUTPUT ATT SW (AUDIO MAIN)	:	MID (Centre)
INPUT IMPEDANCE SW (S7 AUDIO 2)	:	HIGH

2-1. PLAYBACK EQUALIZER ADJ.

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
LINE OUT	PLAY	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT FREQUENCY RESPONSE (15min~21min)	VTVM	-----	VR107 (CH1 PB EQ) VR307 (CH2 PB EQ) SW101 SW301
Step 1. Connect the VTVM to CH1 LINE OUT.			Adjust VR107 (CH1 PB EQ) so that the level difference from 1KHz to 15KHz is within ± 1 dB.		
Step 2. Connect the VTVM to CH2 LINE OUT.			Adjust VR307 (CH2 OB EQ) so that the level difference from 1KHz to 15KHz is within ± 1 dB.		
Step 3. If it is not, change the position of SW102 and SW302, then repeat this Adjustment.			Note: These switches are used for high frequency compensation (7.5KHz ~ 15KHz).		

S6 AUDIO 1

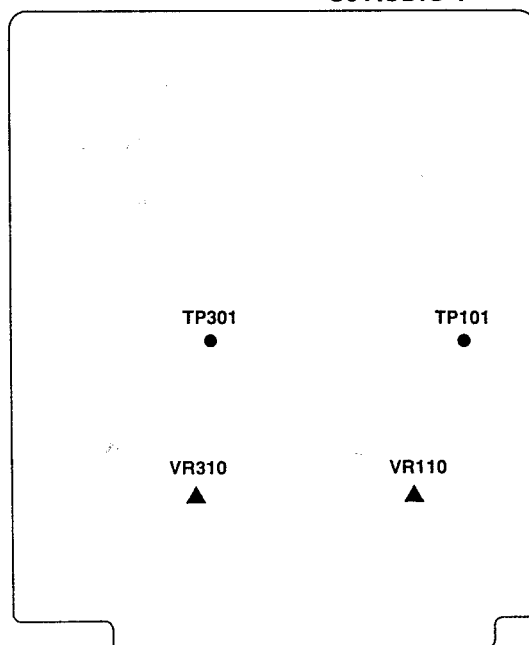


2-2. PLAYBACK LEVEL ADJ.

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP101 TP301	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 1KHz OVU PORTION (0 ~ 6min)	VTVM	-----	VR110 (CH1 PB GAIN) VR310 (CH2 PB GAIN)
Step 1. Connect the VTVM to TP101.			Adjust VR110 (CH1 PB GAIN) so that the signal level is -6dBm \pm 0.2dBm. (1.096 Vp-p, 387.5mVrms).		
Step 2. Connect the VTVM to TP301.			Adjust VR310 (CH2 PB GAIN) so that the signal level is -6dBm \pm 0.2dBm. (1.096 Vp-p 387.5mVrms).		

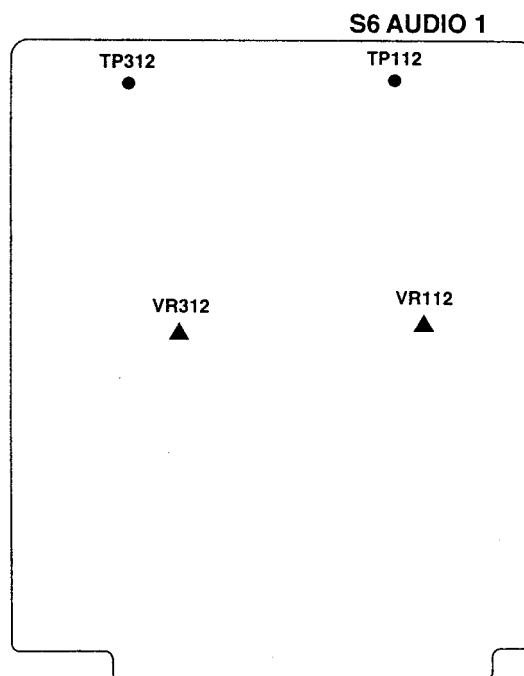
S6 AUDIO 1



2-3. PLAYBACK OUTPUT LEVEL ADJ.

(S6 AUDIO 1)

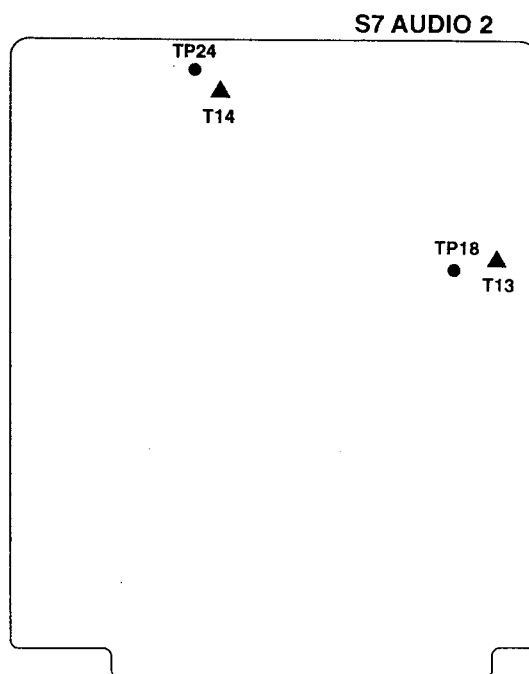
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP112 TP312	PLAY	<input type="checkbox"/> BLANK <input checked="" type="checkbox"/> ALIGNMENT 1KHz OVU PORTION (0 ~ 6min)	VTVM	-----	VR112 (CH1 PB OUT) VR312 (CH2 PB OUT)
Step 1. MACHINE CONDITION			Pull the PB VR (CH1/CH2) on the front panel and set the centre position.		
Step 2. Connect the VTVM to TP112			Adjust VR112 (CH1 PB OUT) to 0dBm ± 0.2 dBm (0.774Vrms, 2.19Vp-p).		
Step 3. Connect the VTVM to TP312			Adjust VR312 (CH2 PB OUT) to 0dBm ± 0.2 dBm (0.774Vrms, 2.19Vp-p).		



2-4. MASTER OSCILLATOR ADJ.

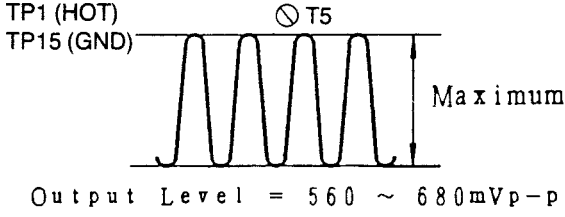
(S7 AUDIO 2)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP18 TP24	RECORD	<div> <div>■</div> BLANK <div>□</div> ALIGNMENT </div>	FREQUENCY COUNTER	-----	T13 T14
Step 1. Adjust T13 at TP18.			OSCILLATOR FREQUENCY : $70 \pm 0.2\text{KHz}$		
Step 2. Adjust T14 at TP24.					

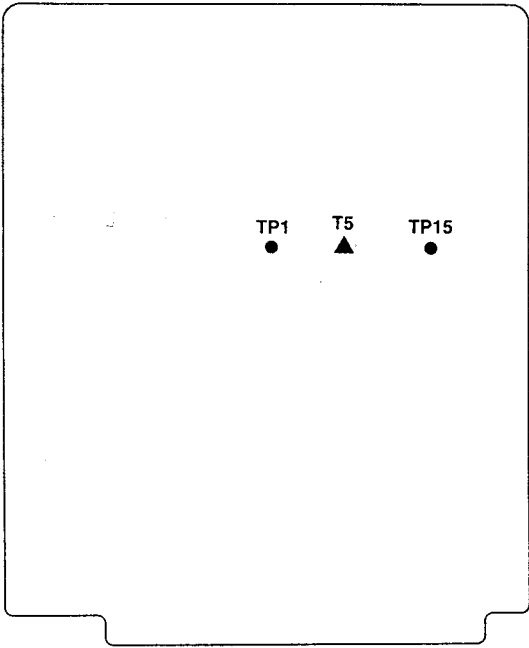


2-5. FULL ERASE CURRENT ADJ.

(S7 AUDIO 2)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP1 (HOT) TP15(GND)	RECORD	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	-----	T 5
<p>Step 1.</p> <p>Adjust T5 so that the signal level is maximum and confirm that it is between 560 and 680mVp-p.</p>			 <p>Output Level = 560 ~ 680mVp-p</p>		

S7 AUDIO 2

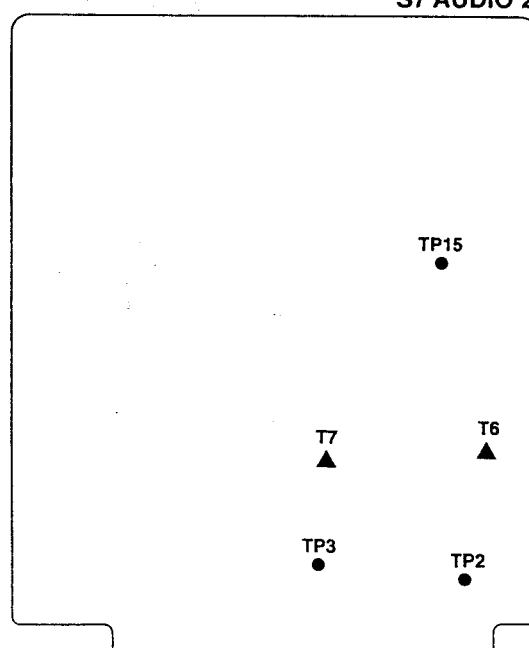


2-6. A/E HEAD ERASE CURRENT ADJ. (1)

(S7 AUDIO 2)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP 2 TP 3 TP15 (GND)	INSERT RECORD	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	-----	T 6 T 7
Step 1. Place the unit in the CH1 INSERT RECORD mode. Adjust T6 so that the signal level is maximum. Confirm that the output level is more than 508mVp-p.					
Step 2. Place the unit in the CH2 INSERT RECORD mode. Adjust T7 so that the signal level is maximum. Confirm that the output level is more than 508mVp-p.					
Step 3. Place the unit in the RECORDING mode and confirm that the output level is more than 508mVp-p. If it is not, repeat this adjustment.					

S7 AUDIO 2

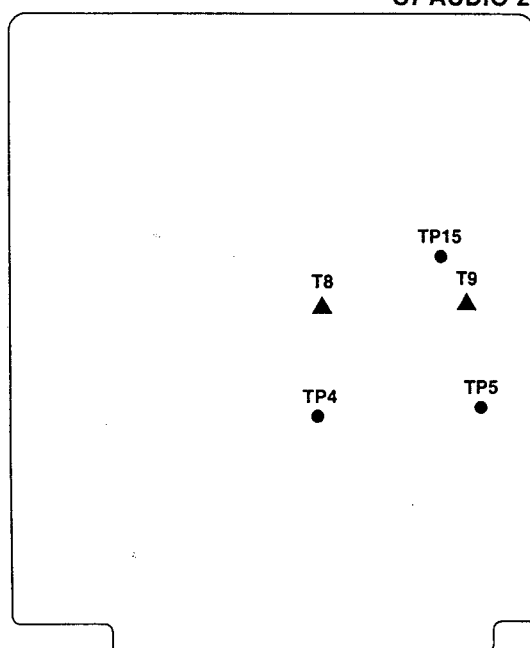


2-7. A/E ERASE CURRENT ADJ. (2)

(S7 AUDIO 2)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP 4 TP 5 TP15 (GND)	INSERT RECORD	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	-----	T 8 T 9
Step 1. Place the unit in the T/C INSERT RECORD mode. Adjust T8 so that the signal level is maximum and confirm that the level is more than 508mVp-p.					
Step 2. Place the unit in the ASSEMBLE RECORD mode with T/C OFF. Adjust T9 so that the signal level is more than 508mVp-p.					
Step 3. Place the unit in the ASSEMBLE RECORD mode with T/C ON. Confirm that the signal level is more than 508mVp-p at TP4 and TP5. If it is not repeat this adjustment.					

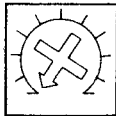
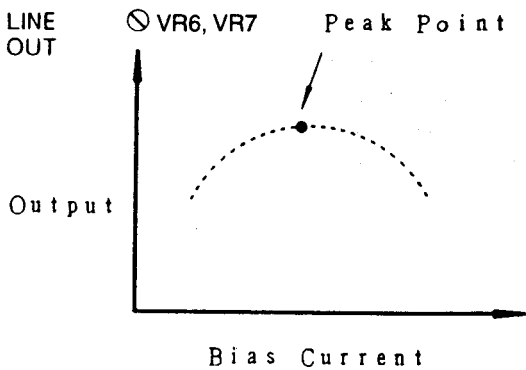
S7 AUDIO 2



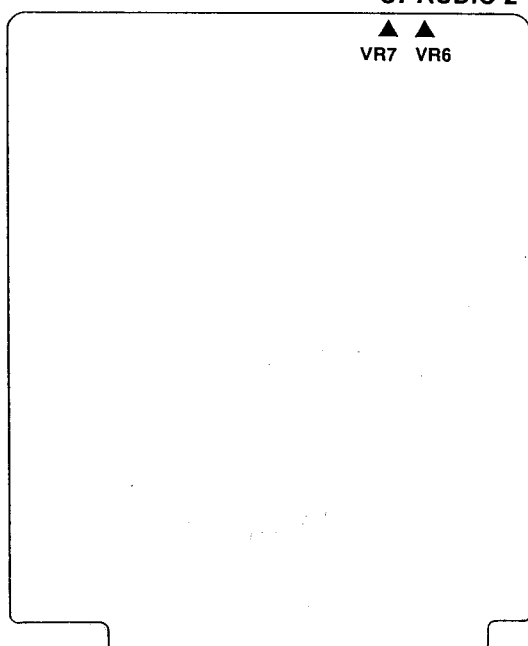
2-8. AUDIO BIAS CURRENT ADJ. (1)

(S6 AUDIO 1)

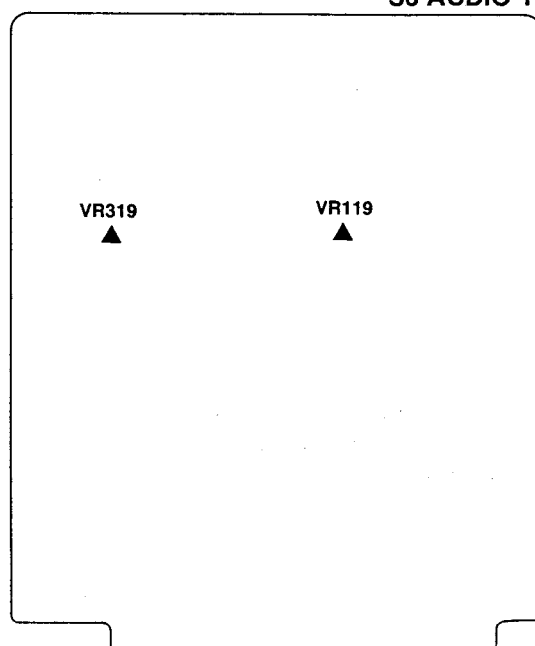
(S7 AUDIO 2)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
LINE OUT (MONITOR)	RECORD	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	1KHz 0dBm	VR119 (CH1 PRE DIS) VR319 (CH2 PRE DIS) (both on the S6 AUDIO 1 P.C.Board) VR 6 (CH1 BIAS CURR) VR 7 (CH2 BIAS CURR) (both on the S7 AUDIO 2 P.C.Board)
Step 1. MACHINE CONDITION			INPUT ATT SW : MID TAPE/EE SELECT : TAPE		
Step 2. Turn VR119 (CH1 PRE DIS) and VR319 (CH2 PRE DIS) fully CCW.			Fully CCW  VR119, VR319		
Step 3. Adjust VR6 (CH1 BIAS CURR) and VR7 (CH2 BIAS CURR) so that the BIAS LEVEL is at a peak point as shown.					

S7 AUDIO 2

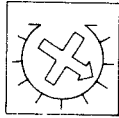
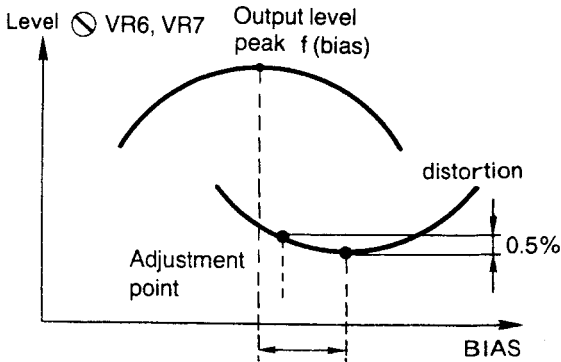


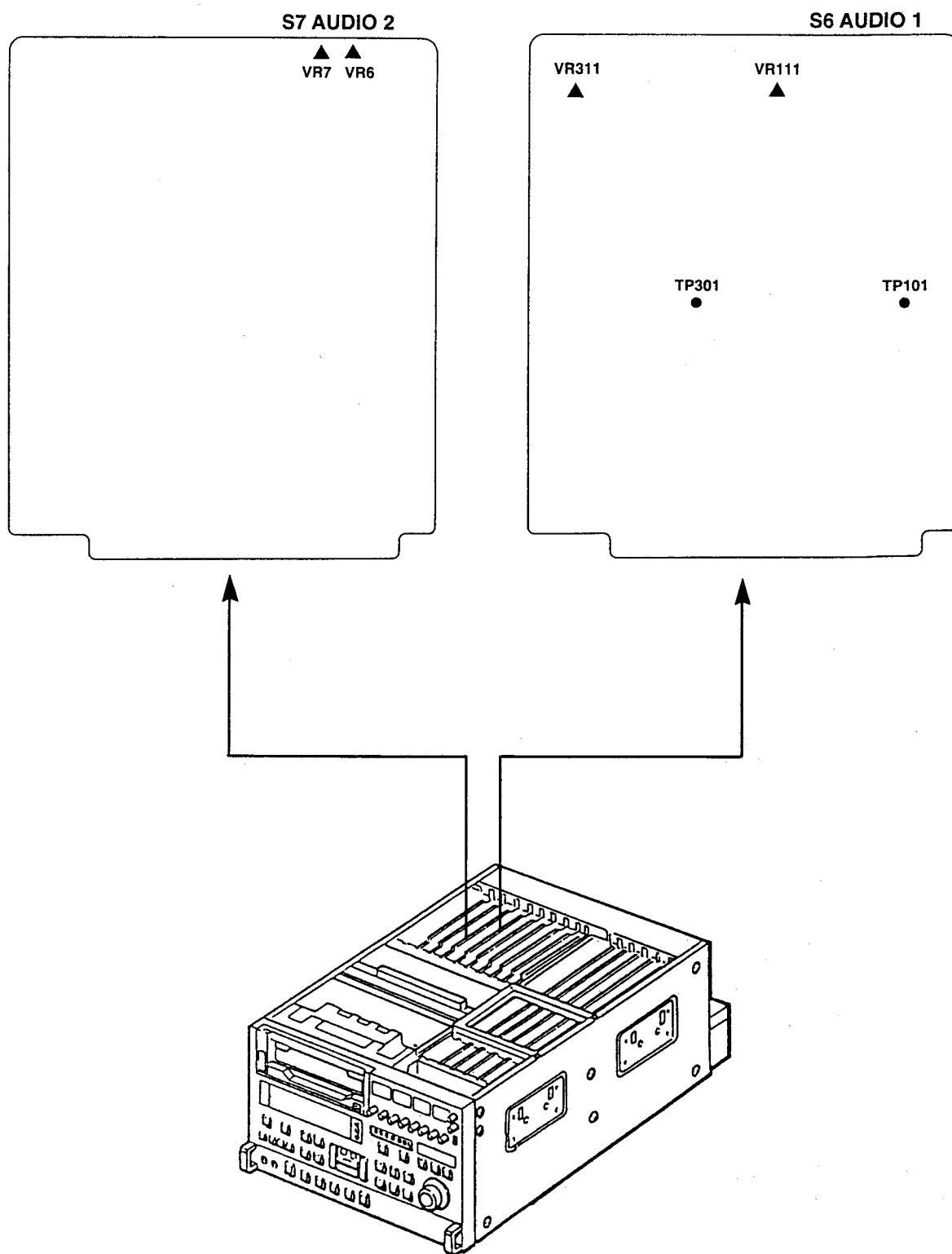
S6 AUDIO 1



2-9. AUDIO BIAS CURRENT ADJ. (2)

(S6 AUDIO 1)
(S7 AUDIO 2)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP101 TP301 (both on the S6 P.C.B.) LINE OUT	RECORD	<div> <div></div> BLANK <div></div> ALIGNMENT </div>	VTVM	1KHz 0dBm 1KHz +8dBm	VR 6 (CH1 REC CURR) VR 7 (CH2 REC CURR) (both on the S7 AUDIO 2 P.C.Board) VR111 (CH1 REC CURR) VR311 (CH2 REC CURR) (both on the S6 AUDIO 1 P.C.Board)
Step 1. MACHINE CONDITION			INPUT ATT : MID TAPE/EE : TAPE		
Step 2. Turn VR116 and VR316 to 10:00 o'clock position (S6 AUDIO 1 P.C.B.)			10:00 o'clock  VR116, VR316		
Step 3. Connect the VTVM to TP101 and confirm that the level is $-6\text{dBm} \pm 0.2\text{dBm}$ (387.5Vrms, 1.096Vp-p). If it is not, adjust VR111 (CH1 REC CURR).					
Step 4. Connect the VTVM to TP301 and confirm that the level is $-6\text{dBm} \pm 0.2\text{dBm}$ (387.5Vrms, 1.096Vp-p). If it is not, adjust VR311 (CH1 REC CURR).					
Step 5. Change the INPUT signal to +8dBm (1.95Vrms, 5.5Vp-p).					
Step 6. Adjust VR6 (CH1 BIAS) and VR7 (CH2 BIAS) so that the distortion response is 0.5% from minimum point of distortion as shown.					

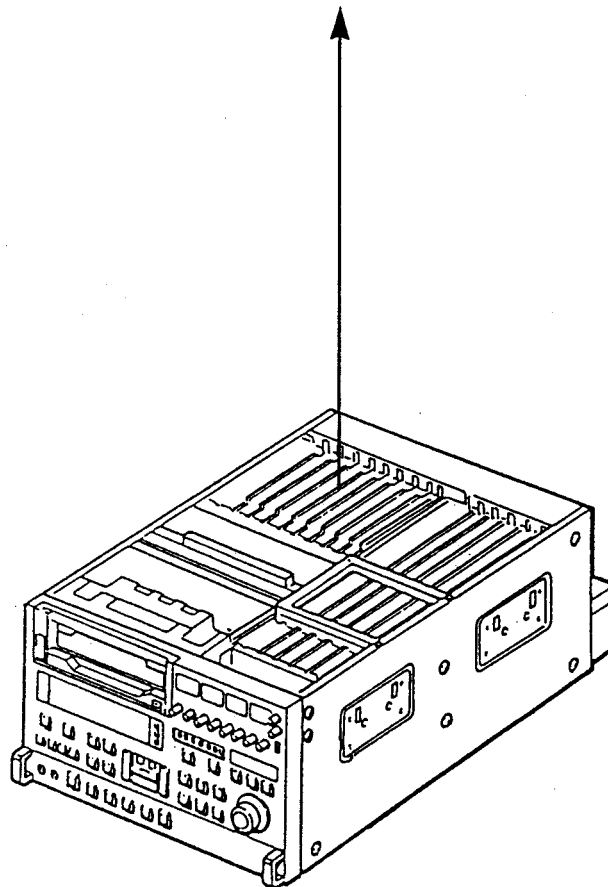
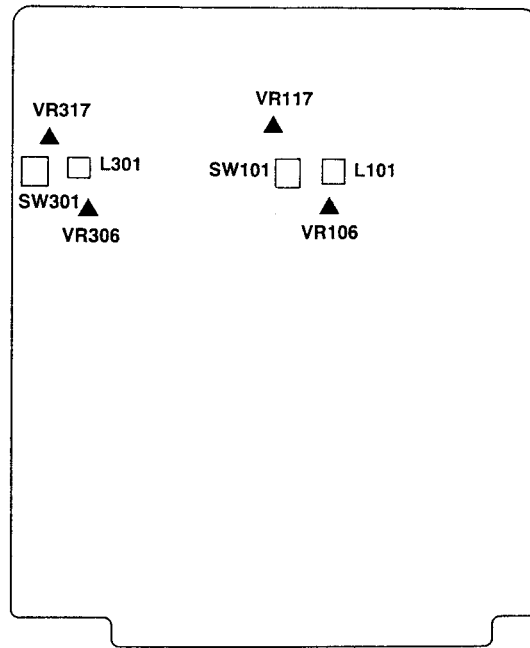


2-10. RECORDING EQUALIZER ADJ.

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH1, CH2 LINE OUT	SELF RECORDING	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	VTVM	40Hz ~ 15KHz 0dBm	L101, L301 SW101, SW301 VR106 (CH1 REC EQ2) VR306 (CH2 REC EQ2) VR117 (CH1 REC EQ) VR317 (CH2 REC EQ)
Step 1. Insert a cassette and place the unit in the RECORD mode. During recording, change the frequency from 40Hz to 125Hz, 1KHz, 7.5KHz, 12.5KHz, and 15KHz.			SPECIFICATION 40 ~ 125Hz : Confirm the output level within $\pm 2.0\text{dB}$. 125 ~ 1KHz : Confirm the output level within $\pm 1.0\text{dB}$. 1KHz : 0dB (REFERENCE) 1 ~ 7.5KHz : Adjust SW101 (SW301) so that the output level is within $\pm 1\text{dB}$. 7.5 ~ 12.5KHz : Adjust VR117 (VR317), L101 (L301) so that the output level is within $\pm 1\text{dB}$. 12.5 ~ 15KHz : Adjust VR106 (VR306) so that the output level is within $\pm 1\text{dB}$.		
Step 2. Play back the just recorded portion and confirm that the output levels from 1KHz to 15KHz are equal ($\pm 1\text{dB}$).					
Step 3. LINE OUT : CH1 If they are not, adjust L101, SW101, VR117 (CH1 REC EQ) and VR106 (CH1 REC EQ).					
Step 4. LINE OUT : CH2 Adjust SW301, L301, VR317, (CH2 REC EQ) and VR306 (CH2 REC EQ) using the same method as used before so that the output levels from 1KHz to 15KHz are equal ($\pm 1\text{dB}$).					
Note: After adjustment, RECORDING LEVEL adjustment is necessary.					

S6 AUDIO 1

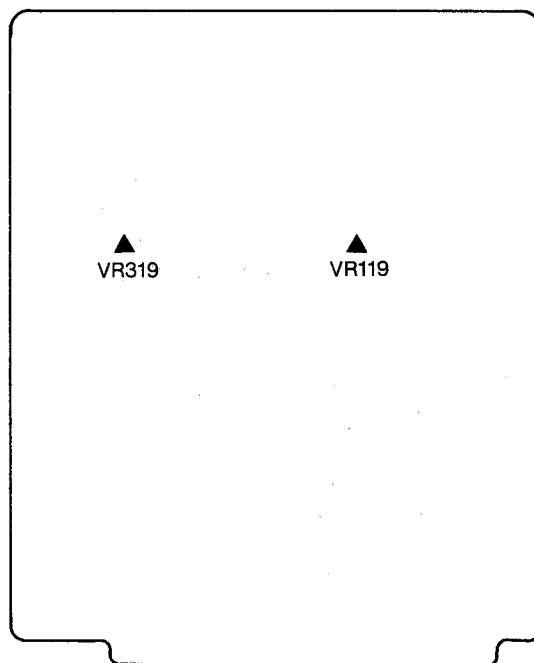


2-11. PRE-DISTORTION ADJ.

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH1, CH2 LINE OUT	REC/PLAY	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	DISTORTION METER	80Hz +8dBm	VR119 (CH1 PRE DIS) VR319 (CH2 PRE DIS)
Step 1. MACHINE CONDITION			INPUT ATT : MID TAPE/EE : TAPE		
Step 2. Distortion Meter : LINE OUT CH1			Adjust VR119 so that the distortion is minimum.		
Step 3. Distortion Meter : LINE OUT CH2			Adjust VR319 so that the distortion is minimum.		
Step 4. After this adjustment, RECORDING LEVEL adjustment is necessary.					

S6 AUDIO 1

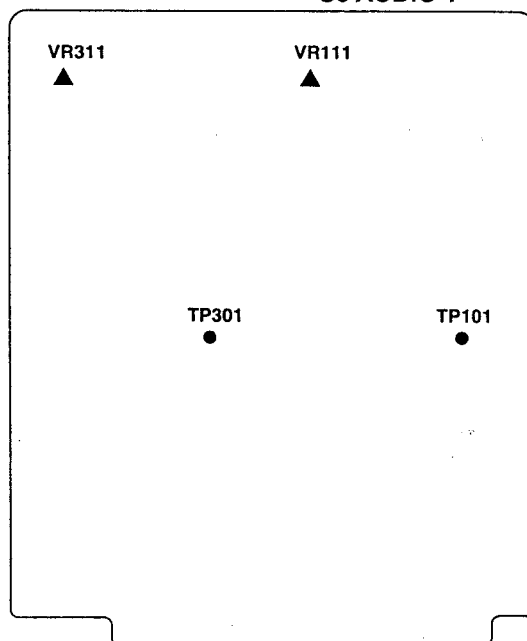


2-12. RECORDING LEVEL ADJ.

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP101 TP301	SELF RECORDING	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	VTVM	1KHz 0dBm	VR111 (CH1 REC CURR) VR311 (CH2 REC CURR)
Step 1. Connect the VTVM to TP101. Playback the just recorded portion.			Adjust VR111 (CH1 REC CURR) to -6dBm \pm 0.2dBm.		
Step 2. Connect the VTVM to TP301. Playback the just recorded portion.			Adjust VR311 (CH2 REC CURR) to -6dBm \pm 0.2dBm.		

S6 AUDIO 1

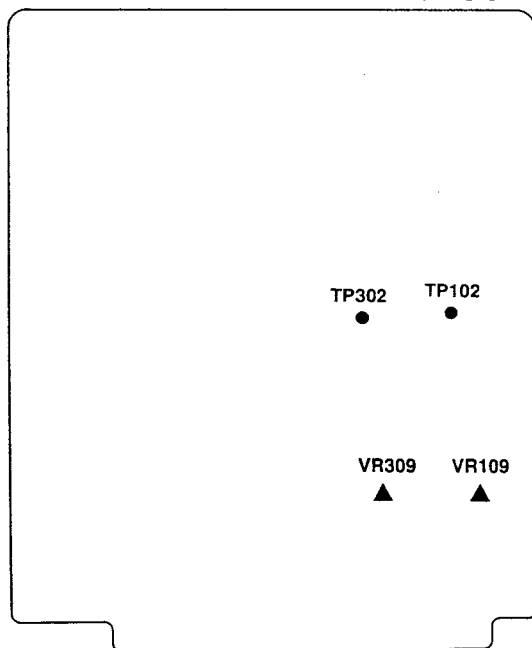


2-13. MONITOR PLAYBACK GAIN ADJ.

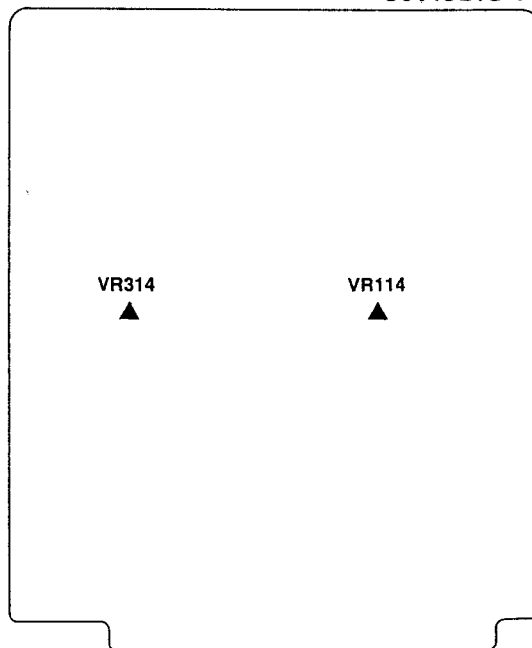
(S8 AUDIO 3)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP102 TP302	SELF RECORDING (Confidence playback)	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	VTVM	1KHz 0dBm	VR109 (CH1 MONI GAIN) VR309 (CH2 MONI GAIN) VR114 (CH1 MONI OUT) VR314 (CH2 MONI OUT) (both on the S6 AUDIO 1 P.C.Board.)
Step 1. MACHINE CONDITION			TAPE/EE : TAPE		
Step 2. Connect the VTVM to TP102.			While recording mode adjust VR109 (CH1 MONI GAIN) so that the output level is -6dBm +/- 0.2dBm (1.096Vp-p, 387.5mVrms).		
Step 3. Connect the VTVM to TP302.			While recording mode adjust VR309 (CH2 MONI GAIN) so that the output level is -6dBm +/- 0.2dBm (1.096Vp-p, 387.5mVrms).		
Step 4. Confirm that the LINE OUT level is 0dBm +/- 0.2dBm.			If it is not, adjust VR114 (CH1 MONI OUT) or VR314 (CH2 MONI OUT). Note: When confirming the LINE OUT level, AUDIO 1, 2 P.C. Board is placed in the unit.		

S8 AUDIO 3



S6 AUDIO 1

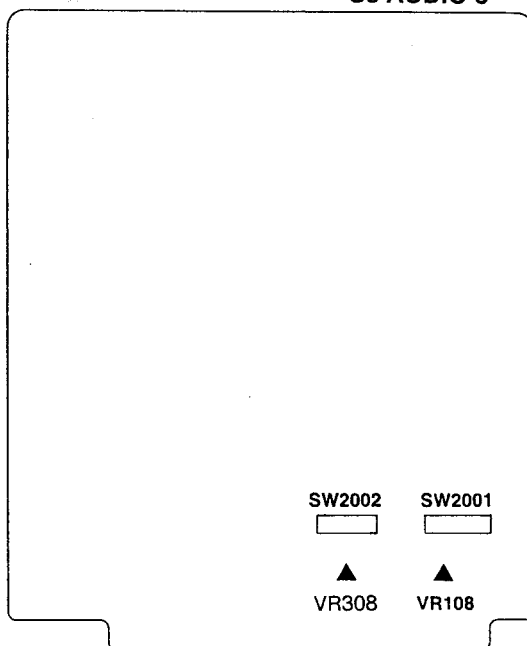


2-14. MONITOR PLAYBACK EQ ADJ.

(S8 AUDIO 3)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH1, CH2 LINE OUT	SELF RECORDING (Confidence Playback)	■ BLANK □ ALIGNMENT	VTVM	40Hz ~ 15KHz -10dBm	VR108 (CH1 MONI EQ) VR308 (CH2 MONI EQ) SW2001, SW2002
Step 1. MACHINE CONDITION			TAPE/EE : TAPE		
Step 2. Insert a cassette and place the unit in the RECORD mode. While recording change the frequency from 40Hz to 1KHz, 10KHz and 15KHz.			SPECIFICATION 40Hz ~ 1KHz : Confirm the output level is within -3.0/+2.0dB. 1KHz : 0dB (REFERENCE) 1KHz ~ 10KHz : Adjust VR108 (VR308) so that the output level is within ± 1.0dB. 10KHz ~ 15KHz: Adjust SW2001 (SW2002) so that the output level is within ± 2.0dB.		
Step 3. LINE OUT : CH1 Adjust VR108 (CH1 MONI EQ) and SW2001 so that the output levels are in specification.					
Step 4. LINE OUT : CH2 Connect the VTVM to the CH2 LINE OUT. Adjust VR308 (CH2 MONI EQ) and SW2002 so that the output level are in specification.					

S8 AUDIO 3



2-15. CROSSTALK CANCEL ADJ. (CH1-CH2)

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH2 LINE OUT	RECORDING (CH1 ONLY)	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	VTVM	9KHz 0dBm	VR101 (HIG PS) VR102 (LOW PS) VR103 (CTC LEVEL)
Step 1. MACHINE CONDITION			CH1 REC VR : Centre detent position (Front Panel) INSERT RECORDING : CH1 ONLY TAPE/EE : EE		
Step 2. Insert a pre-recorded cassette (VIDEO, no Audio) and place the unit in the AUDIO CH1 INSERT RECORD mode (press the Audio Edit button).					
Step 3. Connect the VTVM to CH2 LINE OUT.			Adjust VR103 (CH1 CTC LEVEL), VR102 (CH1 LOW PS) and VR101 (HIGH PS) so that the crosstalk level is less than -38dBm. If it is not, adjust the above VRs according to the following steps. This will ease the adjustment. (VR101 - VR103 - VR102)		

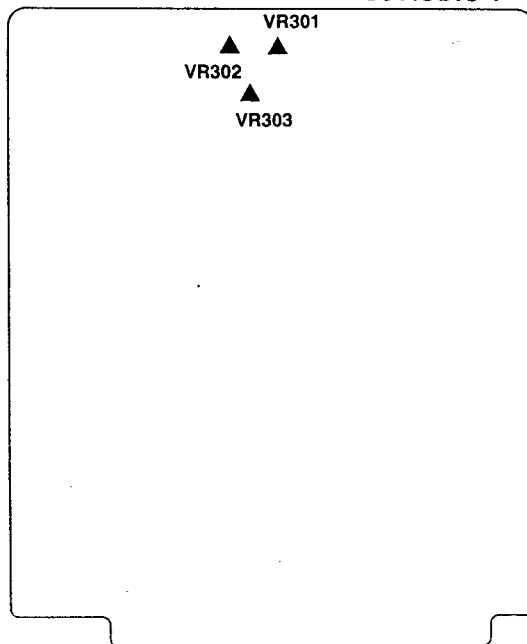


2-16. CROSSTALK CANCEL ADJ. (CH2-CH1)

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH1 LINE OUT	RECORDING (CH2 ONLY)	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	VTVM	9KHz 0dBm	VR301 (HIGH PS) VR302 (LOW PS) VR303 (CTC LEVEL)
Step 1. MACHINE CONDITION			CH2 REC VR : Centre detent position (Front Panel) INSERT RECORDING : CH2 ONLY TAPE/EE : EE		
Step 2. Insert a pre-recorded cassette (VIDEO, no AUDIO) and place the unit in the AUDIO CH2 insert record mode (press the Audio Edit button).					
Step 3. Connect the VTVM to CH1 LINE OUT			Adjust VR303 (CTC LEVEL) VR302 (LOW PS), and VR301 (HIGH PS) so that the crosstalk level is less than -38dBm. If it is not, adjust the above VRs according to the following steps. This will ease the adjustment. (VR301-VR303-VR302)		

S6 AUDIO 1



2-17. RECORDING PHASE ADJ.

(S6 AUDIO 1)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH1, CH2 LINE OUT	SELF RECORDING	■ BLANK □ ALIGNMENT	OSCILLO SCOPE	10KHz 0dBm	VR116 (CH1 REC PS) VR316 (CH2 REC PS)

Step 1.

Play back after 1 minute from the beginning of recorded tape and confirm that the phase difference between CH1 and CH2 is +/- 1.39 usec (+/- 5 degree) as shown figure.

Step 2.

If the CH1 phase is advanced.

Turn VR116 (CH1 REC PS) CW so that the phase of CH1 and CH2 is matched.

Step 3.

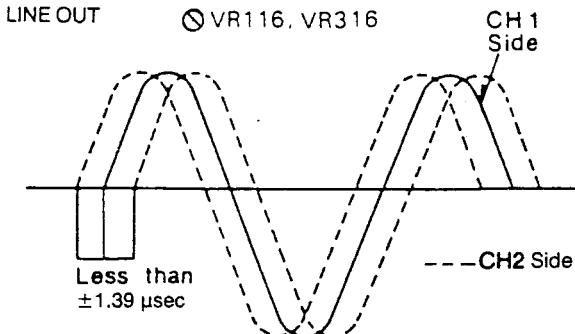
If the CH2 phase advanced.

Turn VR316 (CH2 REC PS) CW so that the phase of CH1 and CH2 is matched.

LINE OUT

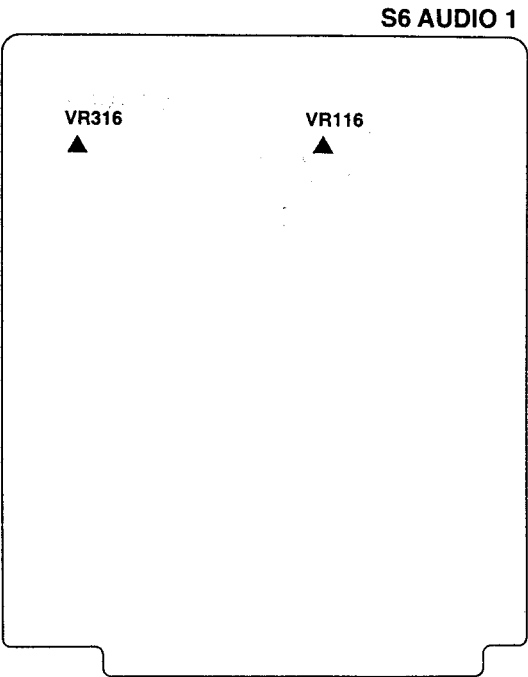
⊗ VR116, VR316

CH 1 Side



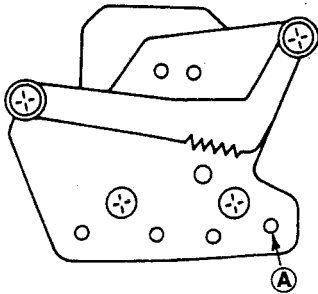
Less than
±1.39 μsec

---CH2 Side



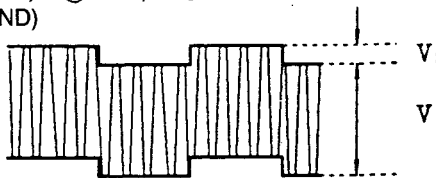
2-18. CONFIDENCE PLAYBACK PHASE ADJ.

(A/C HEAD)

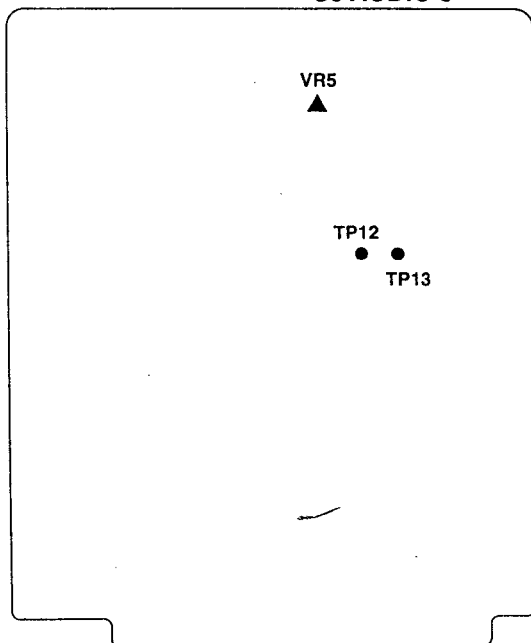
TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
CH1, CH2 LINE OUT	CONFIDENCE PLAYBACK	<input checked="" type="checkbox"/> BLANK <input type="checkbox"/> ALIGNMENT	OSCILLO SCOPE	10KHz 0dBm	HEX SCREW
Step 1. MACHINE CONDITION			TAPE/EE : TAPE		
Step 2. Determine that the Recording phase is A degree accordance with RECORDING PHASE ADJUSTMENT.					
Step 3. Place the unit in the recording mode. While recording, adjust screw A so that the confidence playback phase is matched with recording phase. (+/- 5 degree)(Refer to RECORDING PHASE ADJ.)					

2-19. T/C BIAS CURRENT ADJ.

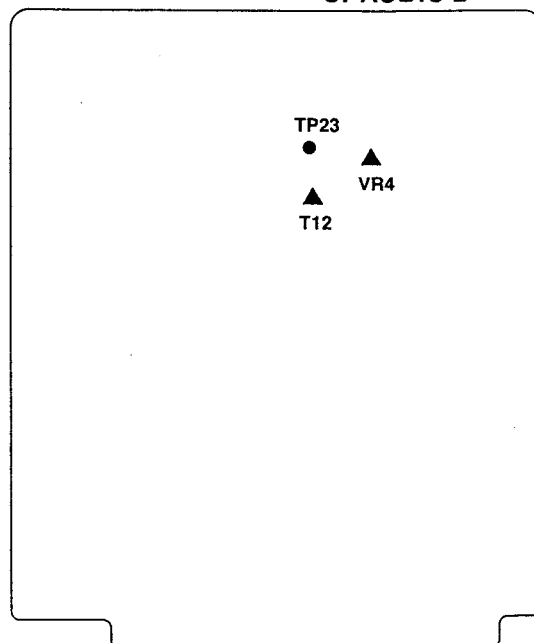
(S7 AUDIO 2)
(S8 AUDIO 3)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP23 (S7)	RECORDING	■ BLANK □ ALIGNMENT	OSCILLOSCOPE	-----	S7 : T12
TP12 (S8)					S7 : VR4 (TC BIAS CURR)
TP13 (S8)					S8 : VR5 (TC REC CURR)
Step 1. MACHINE CONDITION			INSERT RECORDING : TC		
Step 2. Connect the scope to TP23 and adjust T12 so that the output signal is maximum.			<div>TP12 (HOT) ⊗ VR4, VR5 TP13 (GND)</div>  <div>$V_1 = 62 \pm 3 \text{ mVp-p}$ $V_2 = 5 \pm 0.2 \text{ mVp-p}$</div>		
Step 3. Adjust VR5 (TC REC CURR) so that the V2 level is 5mVp-p (+/- 0.2mVp-p) as shown.					
Step 4. Adjust VR4 (TC BIAS) so that the V1 level is 62mVp-p (+/- 3mVp-p) as shown.					

S8 AUDIO 3



S7 AUDIO 2



3. POST ROLLER UNIT REPLACEMENT AND ADJUSTMENT

1). POST ROLLER UNIT REPLACEMENT

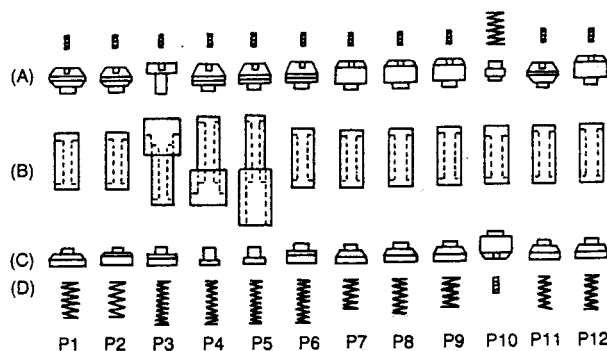
Note:

When you replace a Post roller unit install one at a time, and optimize its position. (Before replacing any more)

REMOVAL

1. Remove the front loading unit.
2. Remove the upper flange of the post. Do not loose the hex screw when the upper flange is removed.
3. Remove the post roller unit (B) (Be sure not to lose the post spring (D) as shown in figure 3-1.

(Fig. 3-1)



INSTALLATION

1. Install new post bearing. (Pay attention to the post roller unit (B) installation)
2. Screw in the upper flange (A). (Do not touch to the hex screw)
3. Clean the post.
4. Play back blank cassette and check tape path. Then adjust the tape linearity.

Note 1 :

P3 and P4 will have to be replaced together. (They can be adjusted together)

Note 2 :

When replacing the posts, do not remove all posts at the same time. (Only P3 and P4 can be replaced together)

2). TAPE INTERCHANGEABILITY ADJUSTMENT

Tools Required :

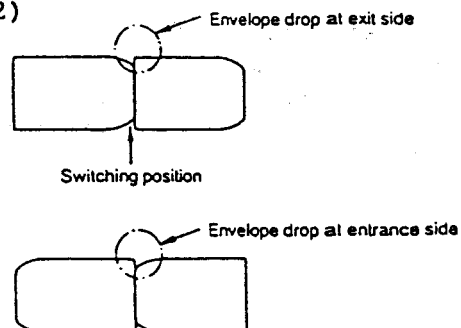
Alignment tape
Post height fixture (VFK0363)
Mechanical Neutral Adjustment Plate (VFK0352)
Post Driver (VFK0293)
Hex Wrench (1.27mm)

GENERAL INSTRUCTIONS

The objectives of this adjustment are follows.

1. To insure smooth tape travel through the entire tape path without tape damage.
2. To obtain good interchangeability of tape among all units.

(Fig. 3-2)



FIRST STEP

Play back a blank or pre-recorded tape and observe the tape path. Pay careful attention to all posts and make sure that tape curling or overriding of post flanges does not occur; use an inspection mirror to allow critical observation.

SECOND STEP

If no tape damage occurs, then the alignment tape may be played back, and the RF envelope checked with an oscilloscope. The RF envelope should be flat. Envelope drop off is most likely to occur at the entrance and exit point (Head Switching) of tape travel around the drum. This is shown in figure 3-2 and careful attention should be paid to these points.

Figure 3-3 shows the recommended sequence of adjustments in flow chart form.

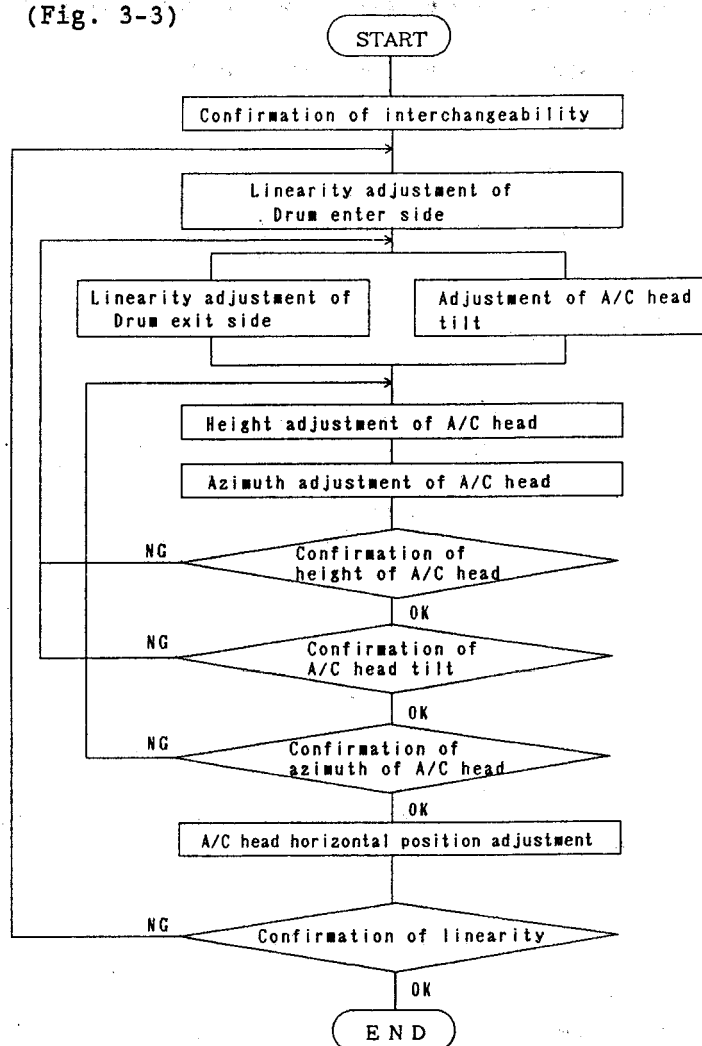
Prior to doing the following adjustments, confirm the height of the P1, P2, P11, and P12 posts is correct so no tape damage occurs in Loading/Unloading mode.

In order to do this, remove the front loading unit, and install the mechanical neutral adjustment plate over the reel tables. Then place the post height fixture on the Mechanical Neutral Adjustment Plate, as shown in figure 3-4. The upper and lower flanges of the P1, P2, P11, and P12 post should be compared to the drawings indicated as good, in figure 3-4. Adjust the post height as needed.

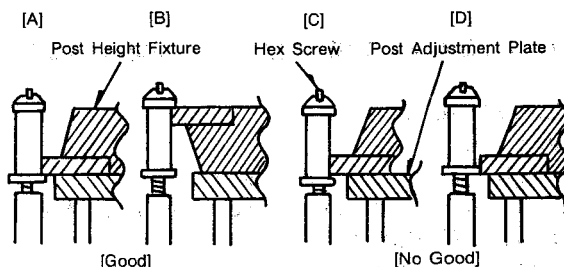
Note:

The set screw in the centre of the top of each post should be loosened before adjusting each post and tightened afterward. Also make sure that no change in height occurs when the set screw is tightened. (Fig. 3-5)

(Fig. 3-3)



(Fig. 3-4)



(Fig. 3-5)

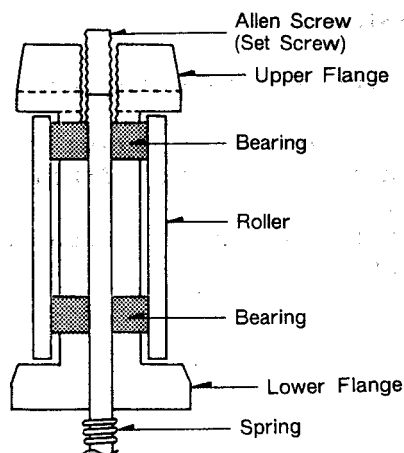
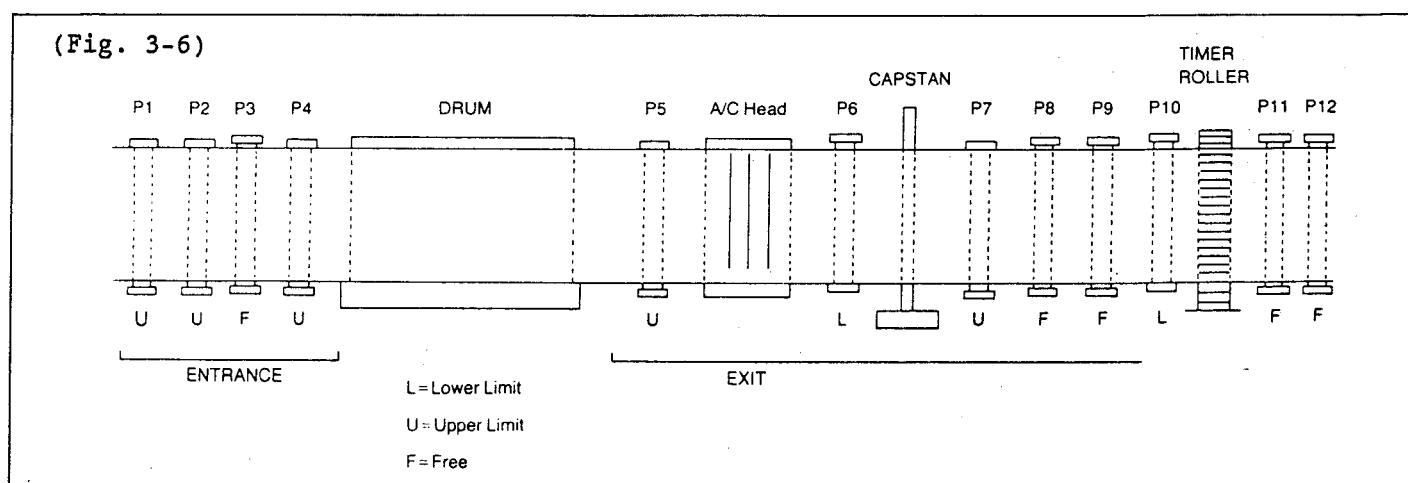


Figure 3-6 shows tape path limit for each post.

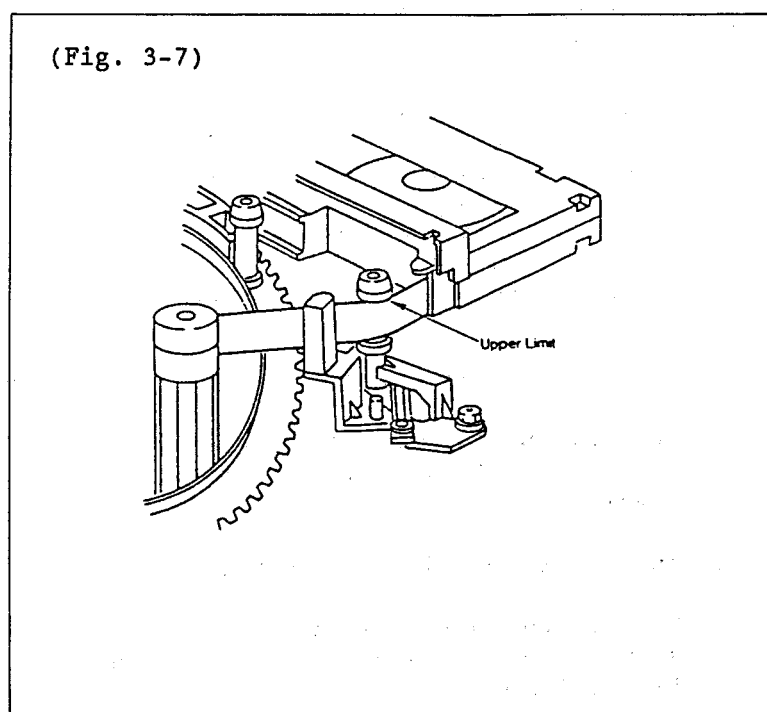


ENTRANCE LINEARITY ADJUSTMENT

1. Remove the front loading unit, disconnect the P406 from the unit and connect the dummy plug (1) to P406. Put the alignment tape over the reel table and place the unit in the loading mode. Connect the oscilloscope to WFM OUT and select C RF with the WFM SELECT on the pull out drawer. Use TP46 on the SERVO P.C. Board (L5) to trigger the scope.
2. Play back the linearity adjustment segment of the alignment tape.
3. In order to avoid the tape damage, loosen the hex of P3 and P4 post so that the flange of P3 and P4 post is set free. (no limit).
4. In above condition, it possible to perform the Entrance Linearity adjustment.

P1 POST ADJUSTMENT LIMIT : UPPER LIMIT

1. Loosen the hex screw and adjust the upper flange so that the P1 post is set to the upper limit. (using fixture)
2. Place the unit in the loading mode and turn power off when the tape is half loaded.
3. Confirm that the tape is not damaged at P1 post. If tape is damaged by P1 post readjust the upper flange of P1 post.



P2 POST ADJUSTMENT LIMIT : UPPER LIMIT

When replace the P2 post, flow chart on right side must be performed.

In order to ease replacement, P2 post tilt adjustment is not necessary when only the P2 post spring Plate is replaced. (inside of [] on flow chart)

Note:

Stopper Pin Base Unit and P2 Post Spring Plate are replaced every 3000H. The Take up side is also replaced every 3000H. Both are replaced at the same time.

P2 Post Replacement

Note:

In order to avoid the tape damage, set the P3 and P4 to free (no limit) during P2 Post Replacement Section.

1. Remove the upper flange (do not loose the hex screw) and remove the P2 post roller.
2. Install the new P2 post roller and reinstall the upper flange (do not tighten the hex screw).

P2 Post Height Coarse Adjustment

1. Playback the work cassette on which is recorded a colour bar signal and observe that the P2 post upper edge has no tape damage.
2. Observe that the entrance side of C RF envelope is between 90-110% as shown in figure 3-8.
3. If it is not, adjust the P2 post upper flange so that the C RF envelope meets the specification.

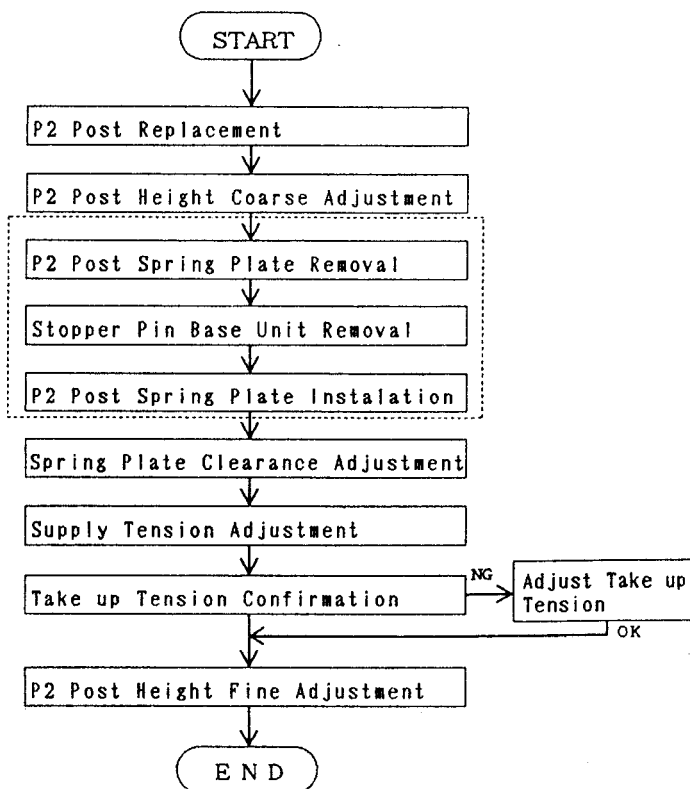
P2 Post Spring Plate Removal

1. Unscrew the 2 screws (A) and remove the Spring Plate Unit as shown in figure 3-9.

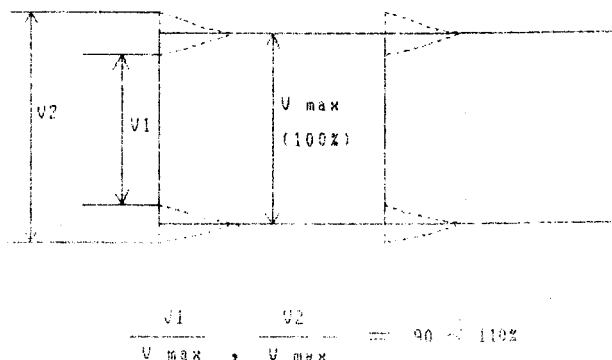
Stopper Pin Base Unit Replacement

1. Unscrew the screw (A) and remove the stopper Pin Base Unit as shown in figure 3-10.
2. Install the new Stopper Pin Base Unit.

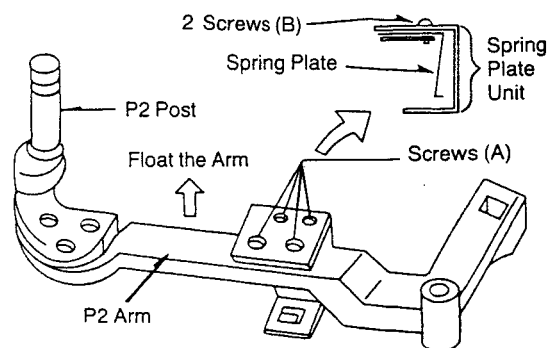
P2 POST ADJUSTMENT FLOW CHART



(Fig. 3-8)



(Fig. 3-9)



P2 Post Spring Plate Installation

1. Unscrew the 2 screws (B) and remove the Spring Plate as shown in figure 3-9.
2. Install the new Spring Plate to Spring Plate Unit.
3. Install the Spring Plate Unit to P2 Post Arm.
4. After replaced, Clearance adjustment must be performed.

Spring Plate Clearance adjustment

1. Make sure there is clearance of 0.05-0.2mm between pin (B) and spring plate (A) as shown in figure 3-11.
2. If out of specification, loosen 4 screws (C) (Fig. 3-12) and turn them to obtain the above-mentioned clearance.
3. Finally, tighten up these screws (Recheck clearance)

Supply Tension Adjustment

Note 1 :

This adjustment should be performed after adjusting the "REFERENCE LEVEL ADJUSTMENT."

Note 2 :

Before perform the confirmation of tape tension Tension Meter should be calibrated as following procedure.

REFERENCE LEVEL ADJUSTMENT

Board : SERVO (L5)

Test Point : TP96

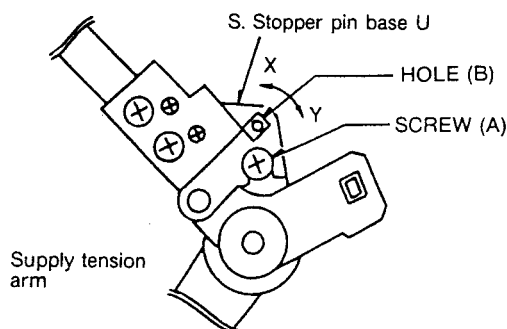
Adjustment : VR38 (OUT REF LEVEL)

1. Extend the SERVO Board (L5).
2. Place the unit in the EJECT mode.
3. Connect a digital voltmeter to TP96, and adjust VR38 (OUT REF LEVEL), so that the DC voltage at TP96 is 150mV (+/- 1mVDC).

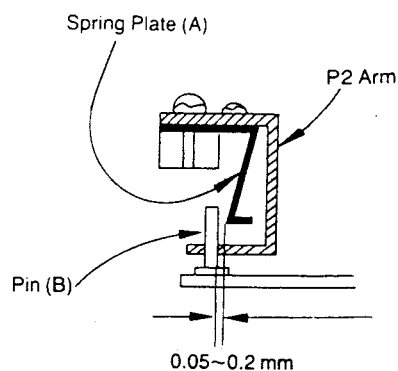
TENSION METER CALIBRATION PROCEDURE

1. Set a MII Metal tape to an ounce weight.
2. Pull up a tape by hand as shown below. (Pull up speed : about 66.295mm/sec)
3. Adjust VR on the Tension Meter so that the tension meter reading is an ounce portion.

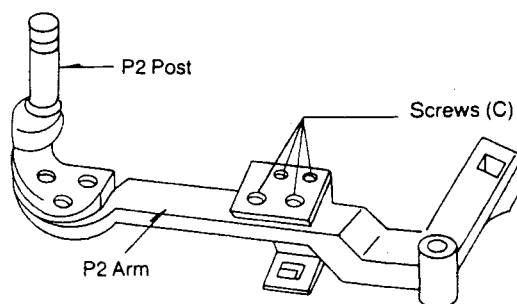
(Fig. 3-10)



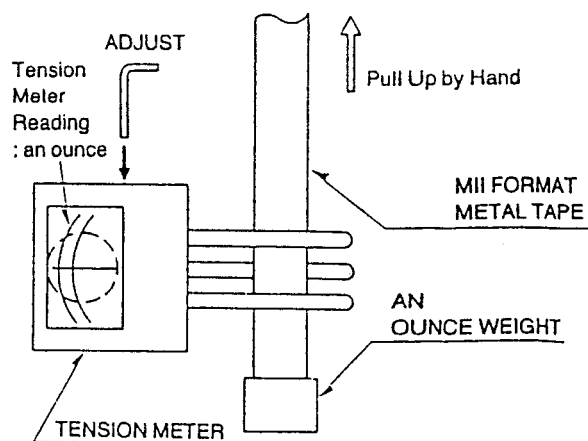
(Fig. 3-11)



(Fig. 3-12)



(Calibration procedure)



Supply Tension Adjustment

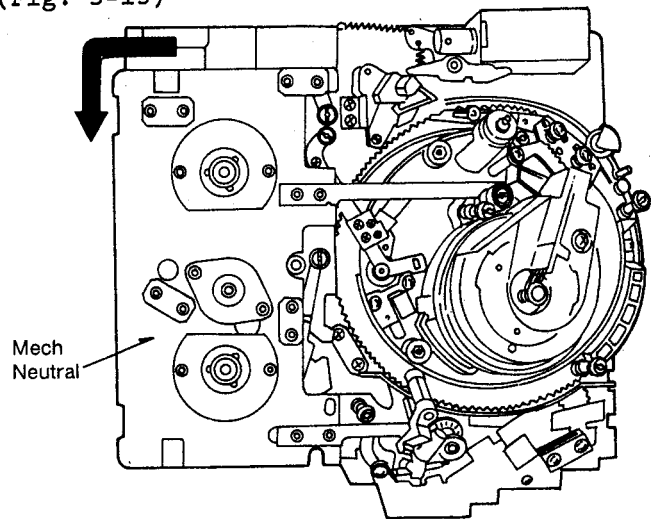
1. Place the unit in the EJECT mode and connect the digital voltmeter to TP82. Adjust VR41 (TENSION SENSOR AMP) for $2.5 \pm 0.002(V)$. (Vs)
2. Set the mechanical neutral adjustment plate over the reel tables and fix the plate as shown in figure 3-13.

Note:

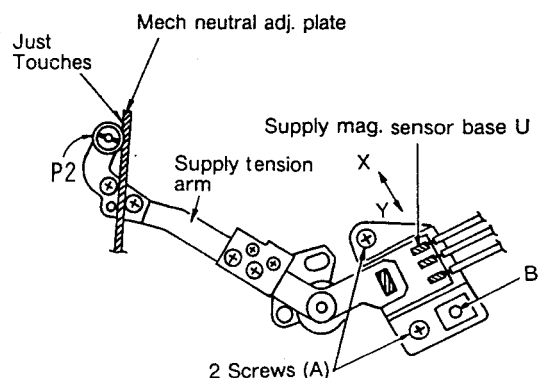
Vs : Supply Reel Sensor Voltage

3. Place the unit in the STOP mode. After loading is completed, make sure that the P2 post touches the arm of the mechanical neutral adjustment plate as shown in figure 3-14.
4. Measure the voltage at TP82 and verify that it is the same as Vs measured in step 1.
5. If it is not, loosen the 2 screws (A) and insert the eccentric screwdriver into hole (B) and adjust the supply magnet sensor base unit until the voltage at TP82 equals Vs ($\pm 0.005V$) (figure 3-14).
6. Tighten the 2 screws (A) (make sure the voltage at TP82 does not change) and remove the mechanical neutral adjustment plate.
7. After this adjustment confirm that the voltage at TP82 will change by more than 100mV, as the P2 post is moved by hand.
8. Connect the jumper wires between TP86, TP88 and TP85 to defeat the tape slack.
9. Connect the digital voltmeter to TP78.
10. Place the unit in the play mode and adjust VR29 so that the voltage at TP78 is the same as Vs ($\pm 0.002V$) as measured in step 5.
11. Place the unit in the SHTL x1 mode and adjust VR33 so that the voltage at TP78 is Vs $\pm 0.002V$.
12. Place the cassette over the reel tables and place the weight on the cassette to hold it in place. (full roll of solder)
13. Place the unit in the play mode and confirm that the tape tension between P1 and P2 post is 23 grams ($\pm 2/-3$ grams) as shown in figure 3-15. (Tape tension confirmation should be done after stabilized the tape movement.)

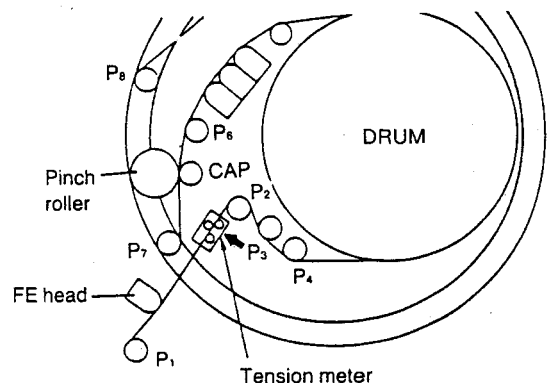
(Fig. 3-13)



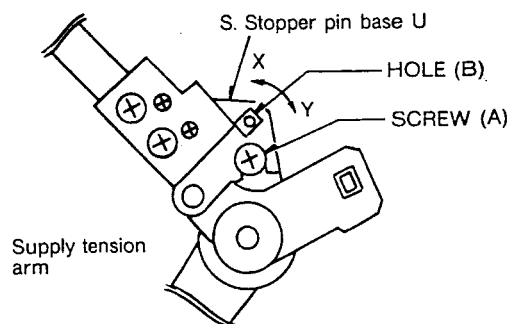
(Fig. 3-14)



(Fig. 3-15)



(Fig. 3-16)



14. If the tension meter reading is not 23 grams (+2/-3 grams), loosen screw (A), and insert the eccentric screwdriver into hole (B) and adjust the tension as shown in figure 3-16.
15. Tighten screw (A).
16. Play back the work cassette from its beginning and adjust VR39 for 0.28V (+/-0.002V) at TP94.
17. Place the unit in the FAST FORWARD mode from tape beginning and adjust VR32 so that the supply side tension is 18 grams (+/-4 grams) between P1 and P2 post.
18. Place the unit in the play mode without the tape and connect the jumper wire between TP85, TP86 and TP88.
19. In order to measure the minimum sensor voltage, hold the supply tension arm by finger so that the spring plate just touches the supply tension arm pin.
20. Measure and record the voltage at TP84 (Vs)
21. Remove the jumper wires between TP88, TP86 and TP85.
22. Place the unit in the STOP mode.
23. In the STOP mode, adjust VR36 so that the voltage at TP86 is (Vs - 1) +0.5/- 0V.

Note:

If the (Vs - 1) is less than 5V, Vs should be adjusted for (Vs - 0.3)V.

Take up Tension Confirmation

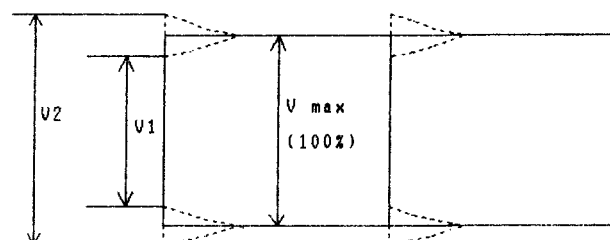
Refer to Tension Adjustment section on page 127.

P2 Post Height Fine Adjustment

1. Play back the colour bar portion of the alignment tape and observe that the P2 Post upper edge has no tape damage.
2. Observe that the entrance side of Chroma RF envelope is between 92-108% as shown in figure 3-17.
3. If it is not, adjust the P2 Post upper flange with small order so that the C RF envelope meets the specification.
4. Set the height of P3 and P4 to original position to maintain the flat envelope.

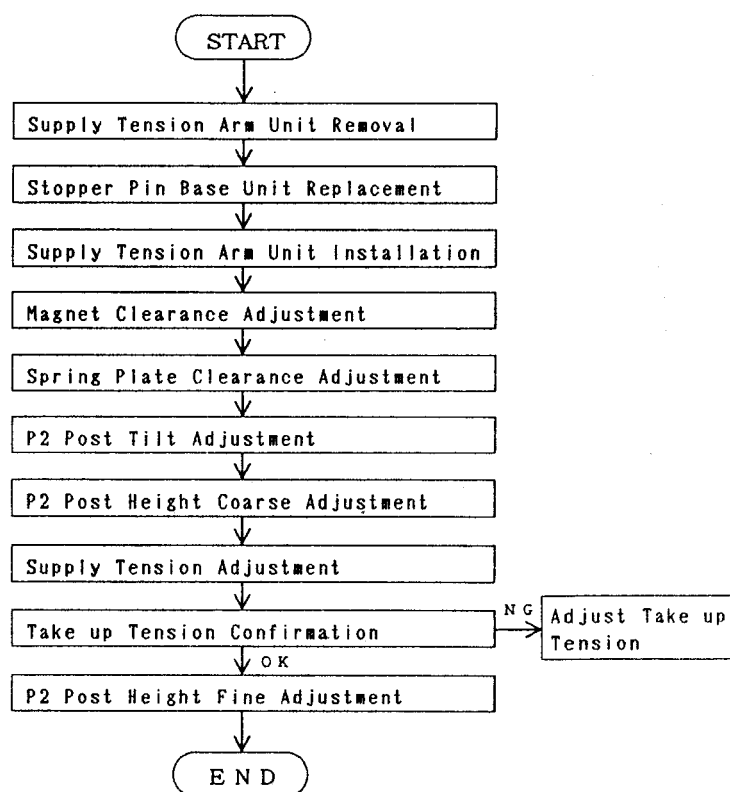
P3 : Free (no limit) (refer to page 120)
P4 : Upper Limit

(Fig. 3-17)



$$\frac{V1}{V_{max}}, \frac{V2}{V_{max}} = 92 \sim 108\%$$

(Supply Tension Replacement Flow Chart)



When replacing the Supply Tension Arm, the flow chart on before page should be performed.

Note :

1. Basically, it is not necessary to replace the supply tension arm unit.
2. Do not adjust the P2 post tilt unless otherwise supply tension arm unit replacing.

Supply Tension Arm Unit Removal

1. Loosen the hex screw (A) and remove the Supply Tension Arm Unit as shown in figure 3-18.

Stopper Pin Base Unit Replacement

Refer to page 112.

Supply Tension Arm Unit Installation.

Note:

Before installing the Supply Tension Arm, the hex screws should be tighten so that P2 post mounting is parallel as shown in figure 3-19.

1. Install the new Supply Tension Arm Unit and tighten hex screw (A).

Note:

When install new Supply Tension Arm Unit, the tension pick-up post will go down, push the tension pick-up post from the bottom side as shown in figure 3-20.

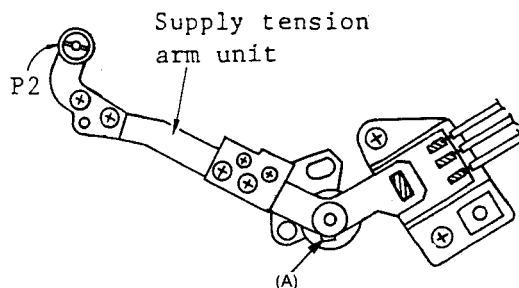
Magnet Clearance Adjustment

1. Press the STOP button without the tape.
2. Observe the clearance between each magnet as shown in figure 3-21. This clearance should be between 0.5 \pm 0.1mm.
3. If it is not, loosen the hex screw (C) and adjust the position of the magnet so that the clearance (A) is within specifications.

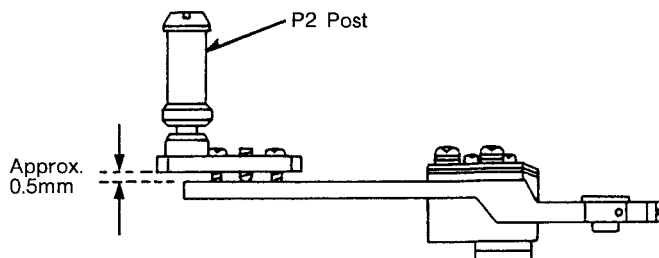
Spring Plate Clearance Adjustment

Refer to page 113.

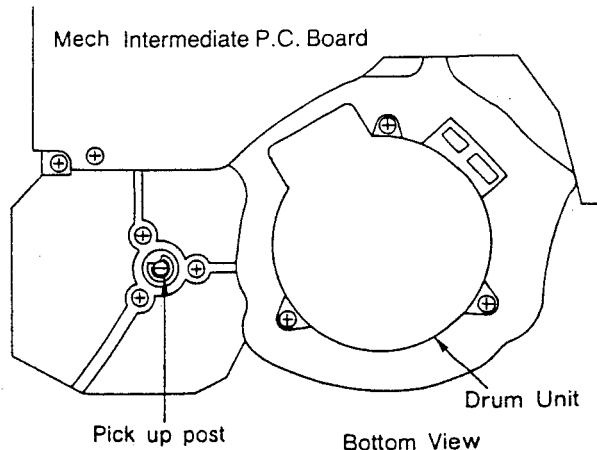
(Fig. 3-18)



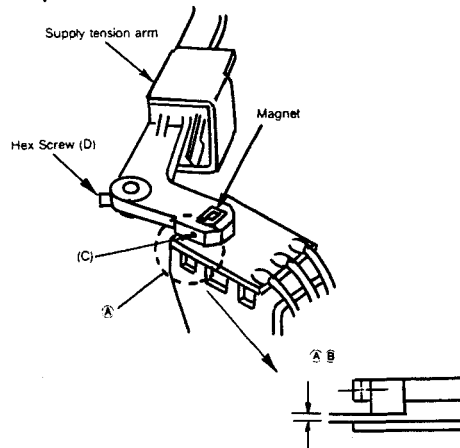
(Fig. 3-19)



(Fig. 3-20)



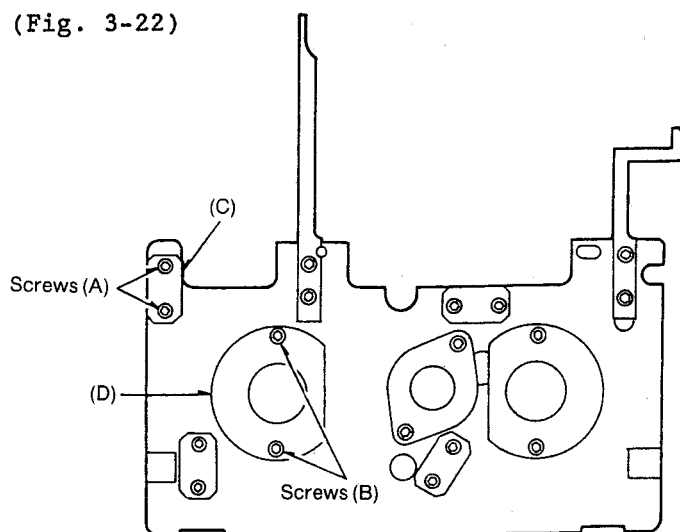
(Fig. 3-21)



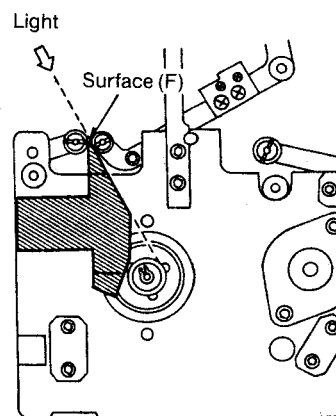
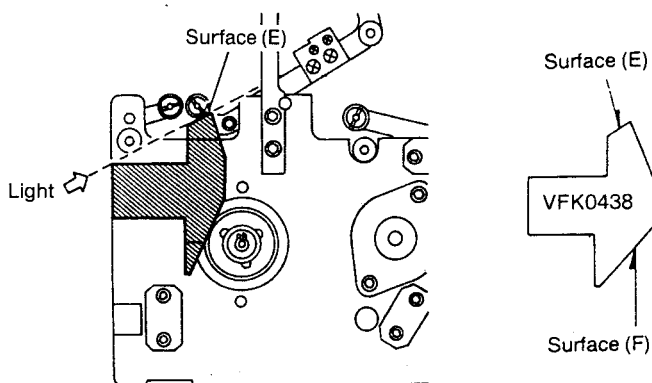
P2 Post Tilt Adjustment

1. Using the mechanical neutral plate, remove thumbscrews (A) and (B). And detach (C) and (D). (See figure 3-22.)
2. Set the P2 post tilt fixture (VFK0438) to the left end of the mechanical neutral adjustment plate. (See figure 3-23.)
3. Bring the P2 post tilt fixture's face (E) and face (F) into contact with the P2 post. Illuminate from the direction of the arrow, and look at the contact area from the opposite side to make sure there is no light coming through.
4. If there is a gap, retighten screws (G) and use hex-screw (H) to readjust the tilt until the faces (E) and (F) become tight. (see figure 3-24.) (Refer back to step 3 for rechecking.)

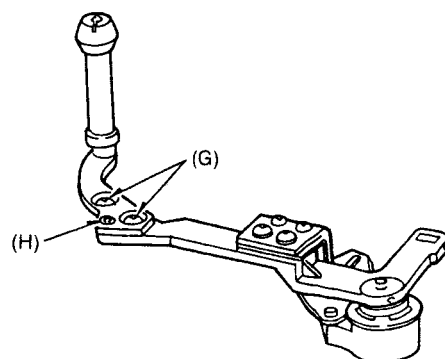
(Fig. 3-22)



(Fig. 3-23)



(Fig. 3-24)



In order to check the P2 post tilt, perform the following checks

Check 1 :

Play back the pre-recorded tape and place the unit in the FWD and REV mode. (FWD/REV as capstan on condition) Confirm that the P2 post is upper limit and no tape deforming during these mode. If it is not, adjust the P2 post tilt using the tilt fixture.

Check 2 :

Play back the pre-recorded tape and place the unit in the SHTL x2 and SHTL x-1 mode. Confirm that the Y and C RF waveform is correct diamond shaped as shown in figure 3-25. If the Y and C RF waveform is out of specification, readjust the P2 post tilt using the tilt fixture.

Check 3 :

Gently press down on the upper edge of the tape as shown in figure 3-26. Displace the tape as necessary to achieve the (B) waveform as shown in figure 3-27.

Then release the tape. The envelope will change from (B) to (C) and back to (A). (figure 3-27)

If the P2 post is properly adjusted, it will take from 1 to 2 seconds to change from (B) to (C) to (A).

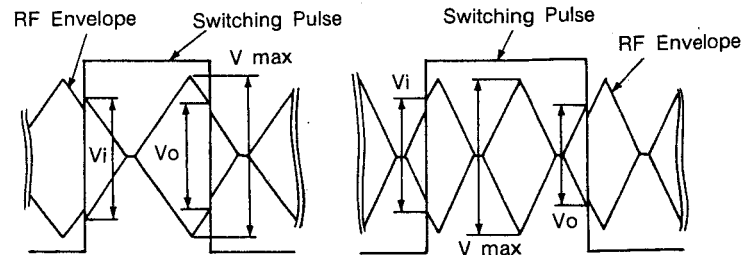
If there is not enough tilt to the P2 post, it will take more than 2 seconds for the envelope to change from (B) to (C) to (A). If this the case, readjust the P2 post using the tilt fixture.

If the P2 post has too much tilt, it will take less than 1 second for the envelope to change from (B) to (C) to (A). Adjust the P2 post tilt using the tilt fixture to achieve a settling time of 1 to 2 seconds.

Check 4 :

Insert a pre-recorded tape, place the unit in the FF/REW mode. Confirm that the envelope does not drop off at the entrance side while the FF/REW mode as shown in figure 3-28. (FF/REW as capstan off condition)

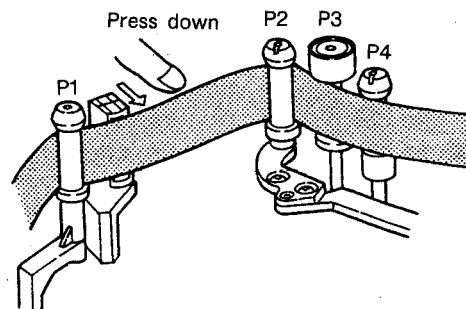
(Fig. 3-25)



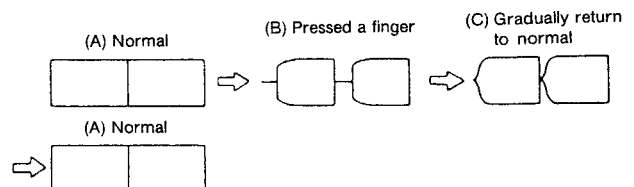
$$\text{SHTL} \times 2 \text{ mode } \frac{V_i - V_o}{V_{\text{max}}} \leq 0.2$$

$$\text{SHTL} \times -1 \text{ mode } \frac{V_i - V_o}{V_{\text{max}}} \leq 0.2$$

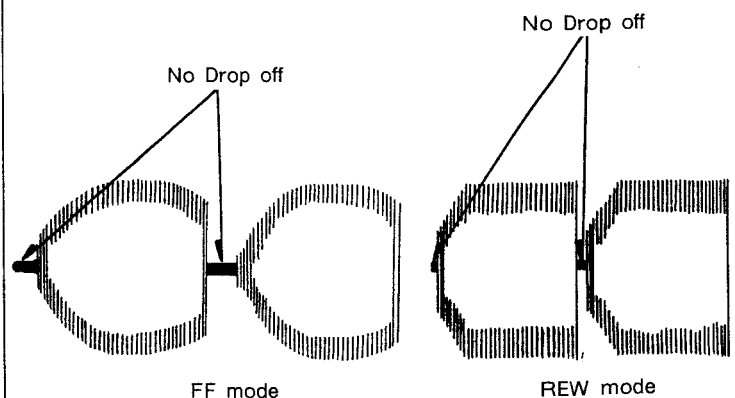
(Fig. 3-26)



(Fig. 3-27)



(Fig. 3-28)



P2 Post Height Coarse Adjustment

1. Set the mechanical neutral plate over the reel tables.
2. Put on the Post Height Fixture on the neutral plate.
3. Adjust the hex screw of P2 post so that the upper flange touches the top edge of the fixture as shown in figure 3-29.

Supply Tension Adjustment

Refer to page 114 or page 127.

Take up Tension Confirmation

Refer to page 127.

P2 Post Height Fine Adjustment

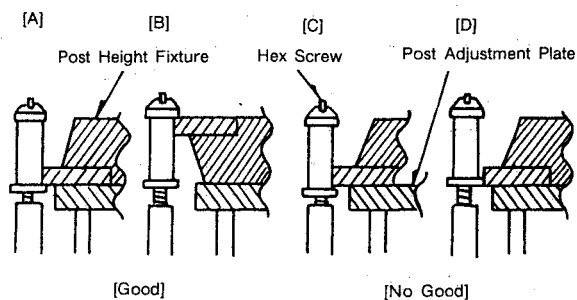
1. Play back the linearity bar portion of the alignment tape.
2. Confirm that the C RF envelope is in a specification as shown in figure 3-30.
3. If it is not, adjust the upper flange of P2 Post.

After the P2 post has been adjusted, make sure that the screws (a), (b) and (c) are locked using locking paint. (refer to figure 3-24.)

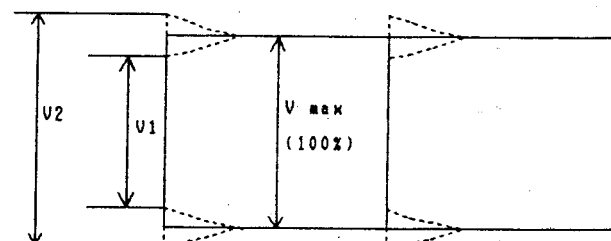
Note 1 :

While observing the envelope, rotate the tracking control VR. The envelope should remain flat without drop off at the head switching area as the envelope amplitude decreases.

(Fig. 3-29)



(Fig. 3-30)



$$\frac{V1}{V_{max}} \cdot \frac{V2}{V_{max}} = 92 \sim 108\%$$

P3 POST ADJUSTMENT

LIMIT : FREE

1. Turn the P3 upper flange to CCW so that the tape lower edge touches the P3 lower flange. (At that time, verify that the envelope entrance side is not changing.)
2. Turn the upper flange of P3 post to 3/4 CW (0.3mm down) as shown in figure 3-31.

P4 POST ADJUSTMENT

LIMIT : UPPER LIMIT

Reposition the P4 post so that its upper flange just touches the top edge of the tape as shown in figure 3-32. Tighten the hex screw to lock this adjustment.

EXIT LINEARITY ADJUSTMENT

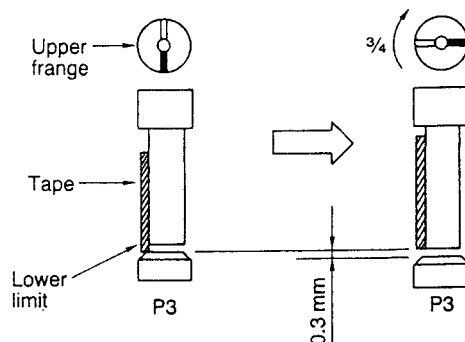
Note:

Both P5 and A/C head affect the RF envelope and the audio level. They must be adjusted together.

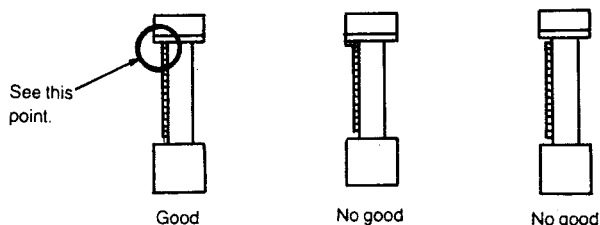
1. The oscilloscope setting is the same as for the entrance linearity adjustment.
2. First play back a blank or pre-recorded tape in the forward and reverse x1 mode and observe the tape at the P5 post. Make sure that no tape curling occurs at the P5 post. Also the upper edge of the tape should just touch the top flange of the P5 post. Adjust the P5 post as necessary.
3. P5 post height adjustment is explained below. (Observe the C RF envelope).

- (1). Play back the linearity portion of the alignment tape. If the envelope is as shown in figure 3-33, lower the P5 post slightly so that the envelope becomes flat.
- (2). If the envelope appears as in figure 3-34, raise the P5 post until the envelope is flat.
- (3). If the envelope is as shown in figure 3-35 both the height of the P5 post, and the tilt of the A/C head will require adjustment.
- (4). After adjustment of the P5 post, confirm that the A/C Head tilt, azimuth and height adjustment is correct. Check also, that P6 to P12 is correct (Refer to A/C Head Adjustment Section)

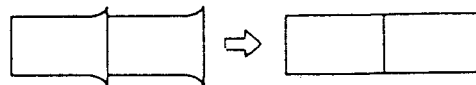
(Fig. 3-31)



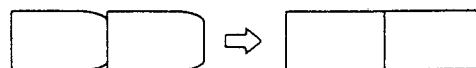
(Fig. 3-32)



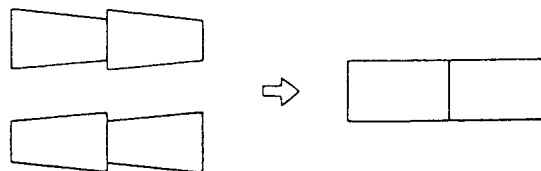
(Fig. 3-33)



(Fig. 3-34)



(Fig. 3-35)



TAPE TRAVEL ADJUSTMENT (P6 - P12)

P6 POST ADJUSTMENT

LIMIT : LOWER LIMIT

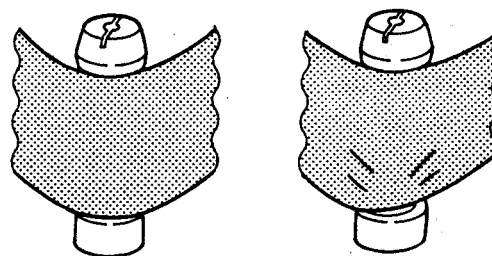
1. Turn upper flange CCW so that the lower flange touches the tape lower edge.
2. Confirm that tape curling or tape damage does not occur at the tape's lower edge in the SHTL X1 and SHTL X-1 mode as shown in figure 3-36.
3. If tape curling or tape damage occurs at the tape's lower edge, waving of RF envelope or audio azimuth changes may occur.

P7 POST ADJUSTMENT

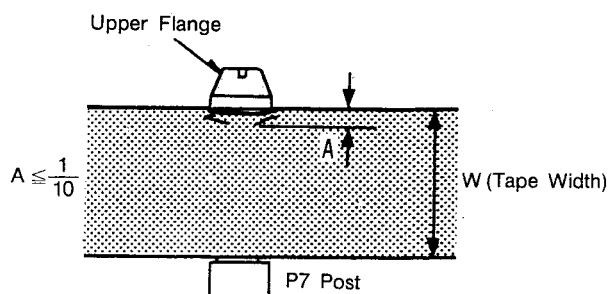
LIMIT : UPPER LIMIT

1. Turn upper flange CW so that the upper flange touches the tape upper edge.
2. Confirm that the tape curling or tape damaging is not occur at the tape upper edge in the SHTL X1 and SHTL X-1 mode as shown in figure 3-37.
3. If too much upper limit is applied, tape deforming or tape curling occur at P6 lower flange in X1 mode. If upper limit is not enough, tape deforming or tape curling occurs at P6 upper flange in X-1 mode.

(Fig. 3-36)



(Fig. 3-37)



P8 POST ADJUSTMENT

LIMIT : LOWER LIMIT

1. Turn upper flange CCW so that the lower flange touches tape lower edge.
2. If lower limit is too low, tape may drop from P8 post in REV mode.

P9 POST ADJUSTMENT

LIMIT : FREE

1. Adjust upper flange so that the tape deforming or tape curling disappears in X1-X4 mode.

P10 POST ADJUSTMENT

LIMIT : LOWER LIMIT

Refer to P10 POST TILT Adjustment (page 123)

P11 POST ADJUSTMENT

LIMIT : FREE

1. Adjust upper flange so that the tape deforming or tape curling disappears in X1-X4 mode.

P12 POST ADJUSTMENT

LIMIT : FREE

1. Adjust upper flange so that the tape deforming or tape curling disappears in X1-X4 mode.
2. During loading/unloading, turn power off when the P12 post touches the tape and confirm that the tape is not damaged.
3. If the tape is damaged, readjust the P12 post.

HORIZONTAL POSITION OF A/C HEAD ADJUSTMENT

Tools Required :

Fine Adjustment Screwdriver (VFK0446)

Eccentric Screwdriver (VFK0357)

Alignment Tape

Note:

Before this adjustment is performed, envelope output, A/C head height and azimuth, and Y PB RF LEVEL adjustments should be confirmed or completed.
(Refer to Y PB RF LEVEL electrical adjustment)

Y PB RF LEVEL ADJUSTMENT (Electrical)

Board : Y PB (S4)

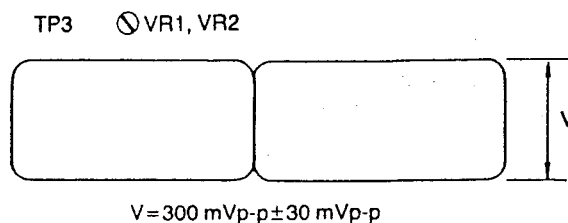
Test Point : TP3

Adjustments : VR1 (R/P RF LEVEL)

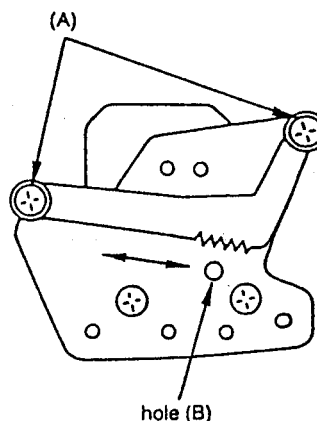
VR2 (AT RF LEVEL)

1. Play back the colour bar portion of alignment tape.
2. Set the HEAD SELECT switch to R/P position.
3. Connect the scope to TP3 and adjust VR1 (R/P RF LEVEL) to 300mVp-p \pm 30mVp-p. (Fig. 3-38)
4. Set the HEAD SELECT switch to PLAY position and adjust VR2 (AT RF LEVEL) to 300mVp-p \pm 30mVp-p. (Fig. 3-38)

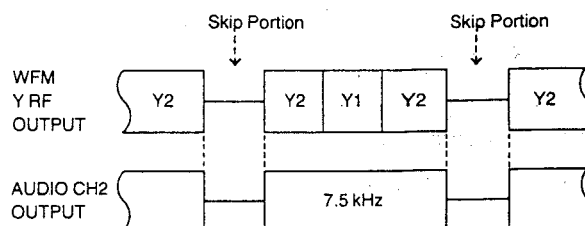
(Fig. 3-38)



(Fig. 3-39)



(Fig. 3-40)



HORIZONTAL POSITION ADJUSTMENT (Mechanical)

1. Insert the alignment tape, and play back the Field Skip portion. (23-26min)
2. Set the tracking control on the front panel to the detent position.
3. Connect CH1 of the oscilloscope to WFM OUT and CH2 to AUDIO CH2 OUT on the rear panel.
4. Select Y RF with the WFM SELECT on the pull out drawer.
5. Loosen the 2 screws (A) a 1/4 of a turn and insert the eccentric adjustment screwdriver into hole (B) as shown in figure 3-39.
6. Adjust the A/C head assembly by turning the eccentric adjustment screwdriver to make the envelope level maximum, and the skip portion in the same position as shown in figure 3-40.
7. If the skip portion is shifted causing by CTL head incorrect position, readjust the A/C head. (After that, audio level confirmation is necessary.)
8. Tighten the 2 screws (A) alternately with small order.

Note:

After this adjustment, confirm the envelope output, height, and azimuth adjustment of the A/C head.

4. IP BASE UNIT REPLACEMENT (WITH P10 POST)

REMOVAL

1. Remove the E-ring (B) and washer as shown in figure 4-1 and 4-2. (Do not drop the E-ring while removing it)
2. Remove the P10 post unit (A). (Do not lose spring and washers)
3. Refer to the previous post roller unit replacement section.

INSTALLATION

1. Refer to the previous post bearing replacement section.
2. Hook the spring (C) to the P10 post unit. Replace the E-ring (B).
3. Play a blank cassette and check tape path. Then adjust the height of P10 post.

ADJUSTMENT

TILT ADJUSTMENT OF P10 (SUB LOADING POST)

Tool Required :

Hex Wrench (2.4mm) and (1.5mm)

1. Loosen the 2 hex screw (A) and hex screw (B).
2. Insert a cassette and place the unit in the FF mode.
3. Confirm the tape movement at the Timer Roller.
4. If the tape movement is upward, turn hex screw (B) CW.
5. If the tape movement is downward, turn hex screw (B) CCW.
6. Tighten 2 hex screw (A).

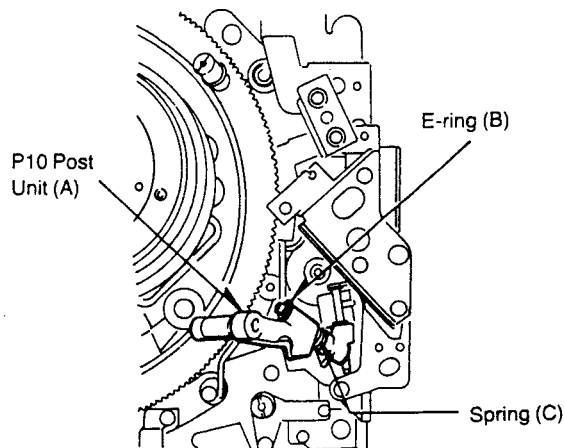
Note :

When the hex screw (B) is turned CCW the roller does not come up. In that case, move the roller by hand.

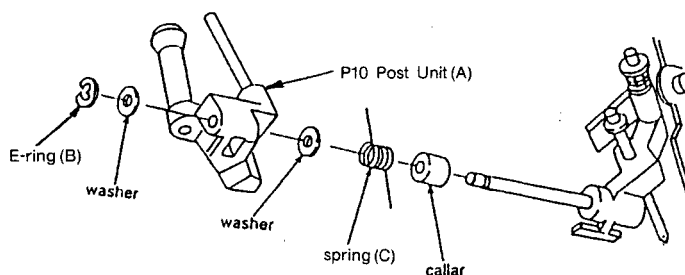
Note :

When tighten 2 hex screws (A), hold the position of sub loading tilt unit using a finger.

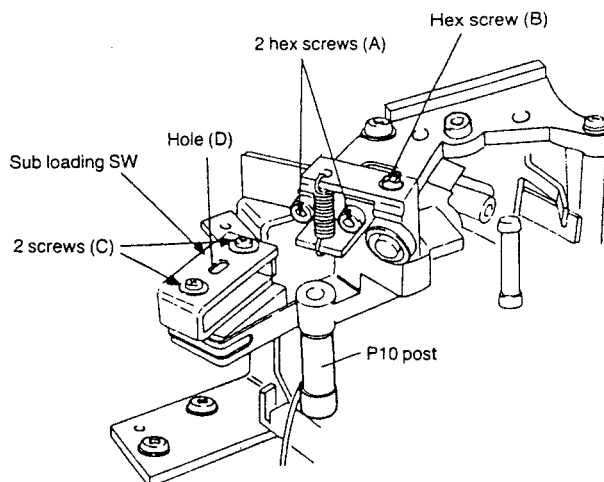
(Fig. 4-1)



(Fig. 4-2)



(Fig. 4-3)



5. TENSION UNIT REPLACEMENT AND ADJUSTMENT

Tools Required

Tentelometer (VFK0132)

Eccentric Screwdriver (VFK0357) (VFK0359)

Digital Voltmeter

SUPPLY TENSION ARM UNIT REPLACEMENT

1. Loosen the hex screw (A) and remove the Supply Tension Unit as shown in figure 5-1.
2. Install the new Supply Tension Arm Unit.
3. After replaced, P2 Post and tension adjustment are necessary accordance with the flow chart on page 115.

Note 1 :

When install new Supply Tension Arm Unit, the tension pick-up post will go down, then push the tension pick-up post from the bottom side as shown in figure 5-2.

Note 2 :

In order to ease replacement, Supply Tension Arm Unit replacement is not necessary when only the P2 post spring Plate is replaced.
(refer to page 112)

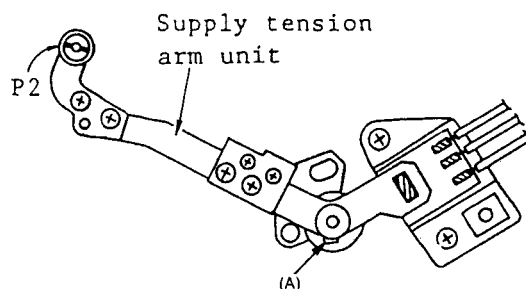
TAKE-UP STOPPER PIN BASE UNIT REPLACEMENT

When replace the take up Stopper Pin Base unit, flow chart on right side must be performed.

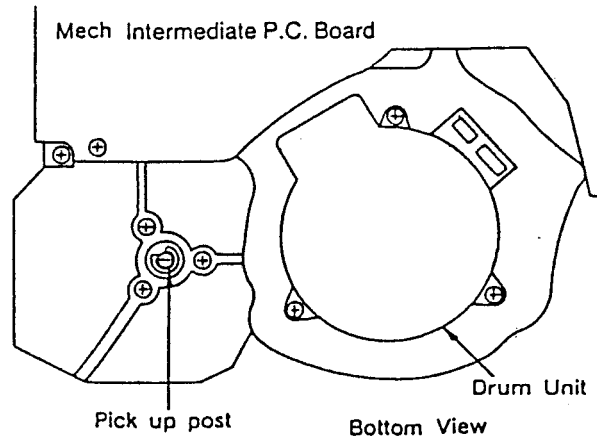
Note :

Take up Pin Base Unit is replaced every 3000H. Also supply side is replaced every 3000H. Both are replaced at the same time.

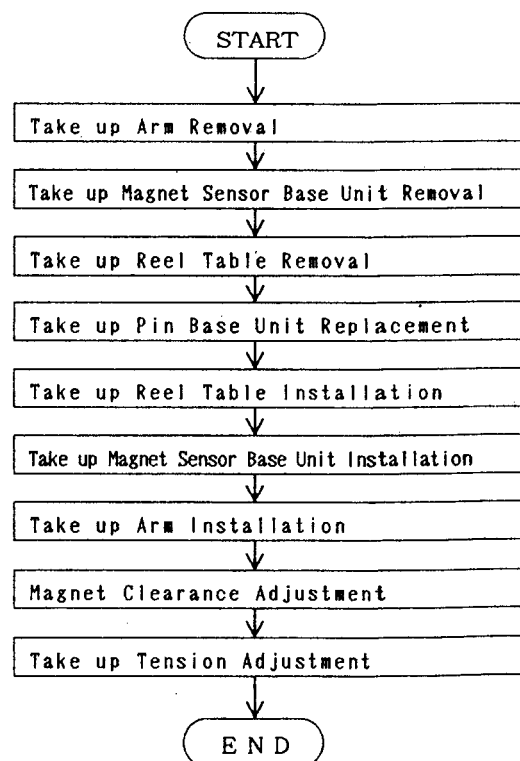
(Fig. 5-1)



(Fig. 5-2)



Flow Chart



TAKE UP ARM REMOVAL

1. Unscrew the hex screw (A) and remove the Take up Arm as shown in figure 5-3.

TAKE UP MAGNET SENSOR BASE UNIT REMOVAL

1. Unscrew the 2 screws (B) and remove the take up magnet sensor base unit as shown in figure 5-3.

TAKE UP REEL TABLE REMOVAL

1. Remove the take up Reel Table.
(refer to page 135.)

TAKE UP PIN BASE UNIT REPLACEMENT

1. Move the loading ring to the completely loaded position.
2. Remove the E-ring (C) as shown in figure 5-4.
3. Lift up the take up pin base unit and turn it to CW.
4. Replace the Take up Pin Base Unit.

TAKE UP REEL TABLE, MAGNET SENSOR BASE UNIT, T-ARM INSTALLATION

1. Follow the removal steps in reverse order. At that time, confirm that the pin of loading gear (D) is touching take-up stopper pin base unit as shown in figure 5-4.
2. Install the T-Stopper pin base unit and tighten screw (E) as shown in figure 5-5.

MAGNET CLEARANCE AND TAKE-UP TENSION ADJUSTMENT

Following sections are adjustment procedure which is also described Supply side.

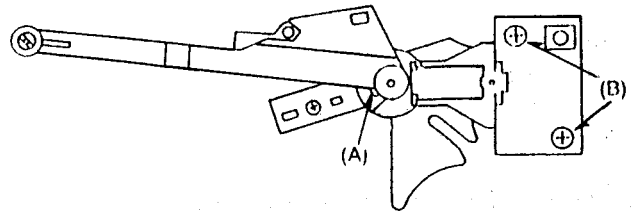
S AND T TENSION MAGNET ADJUSTMENT

Tools Required :

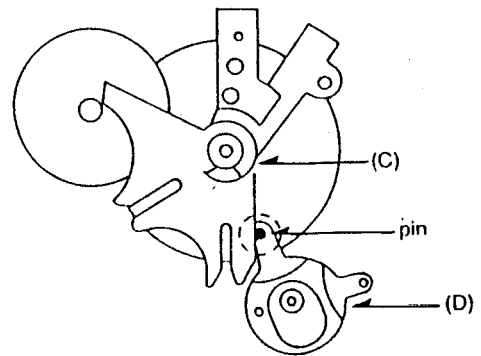
Dummy Plug (1) (VFK0361)

1. Turn the Power off.
2. Remove the Front Loading unit and connect the dummy plug (1) into P406.
3. Turn the Power ON.
4. Press the stop button to load the tape.
5. Check the clearance (A) and (B) between each magnet and sensor. This clearance should be between 0.5 +/- 0.1mm. (figure 5-6)
6. If not, loosen the hex screw (C) and adjust the position of the magnet so that the clearance (A) and (B) is within specifications. (figure 5-6)
7. Tighten the hex screws.

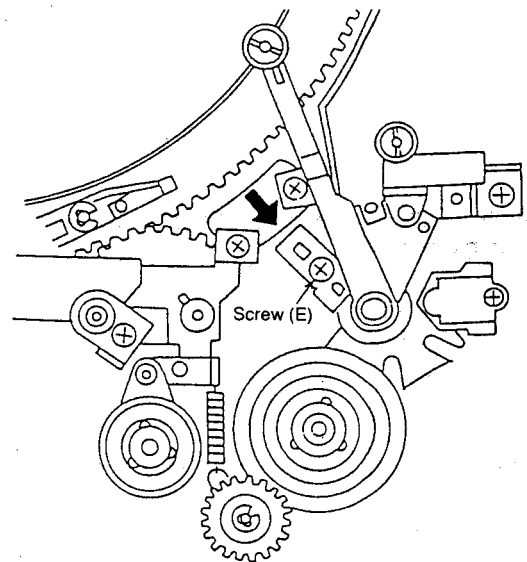
(Fig. 5-3)



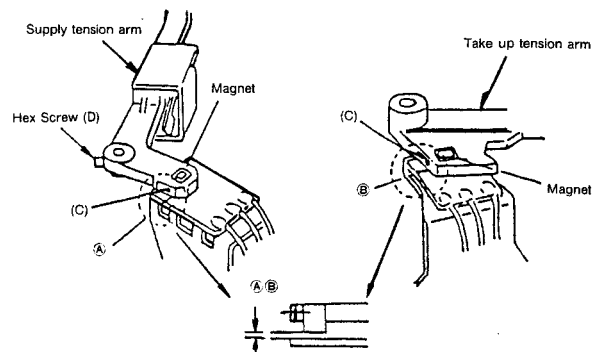
(Fig. 5-4)



(Fig. 5-5)



(Fig. 5-6)



TENSION ADJUSTMENT

Tools Required :

Tentelometer (VFK0132)
Eccentric Screwdrivers (VFK0357)(VFK0359)
Digital Voltmeter
Dummy Plug 1 (VFK0361)

NOTE 1 :

This Adjustment should be performed after adjusting the "REFERENCE LEVEL ADJUSTMENT."

NOTE 2 :

Before perform the confirmation of tape tension, Tension Meter should be calibrated as following procedure.

REFERENCE LEVEL ADJUSTMENT (ELECTRICAL)

Board : SERVO (L5)
Test Point : TP96
Adjustment : VR38 (OUT REF LEVEL)

1. Extend the SERVO Board (L5).
2. Place the unit in the EJECT mode.
3. Connect a digital voltmeter to TP96, and adjust VR38 (OUT REF LEVEL), so that the DC voltage at TP96 is 150mV (+/- 1mVDC).

TENSION METER CALIBRATION PROCEDURE

1. Set a MII Metal tape to an ounce weight.
2. Pull up a tape by hand as shown below. (Pull up speed : about 66.295mm/sec)
3. Adjust VR on the Tension Meter so that the tension meter reading is an ounce portion.

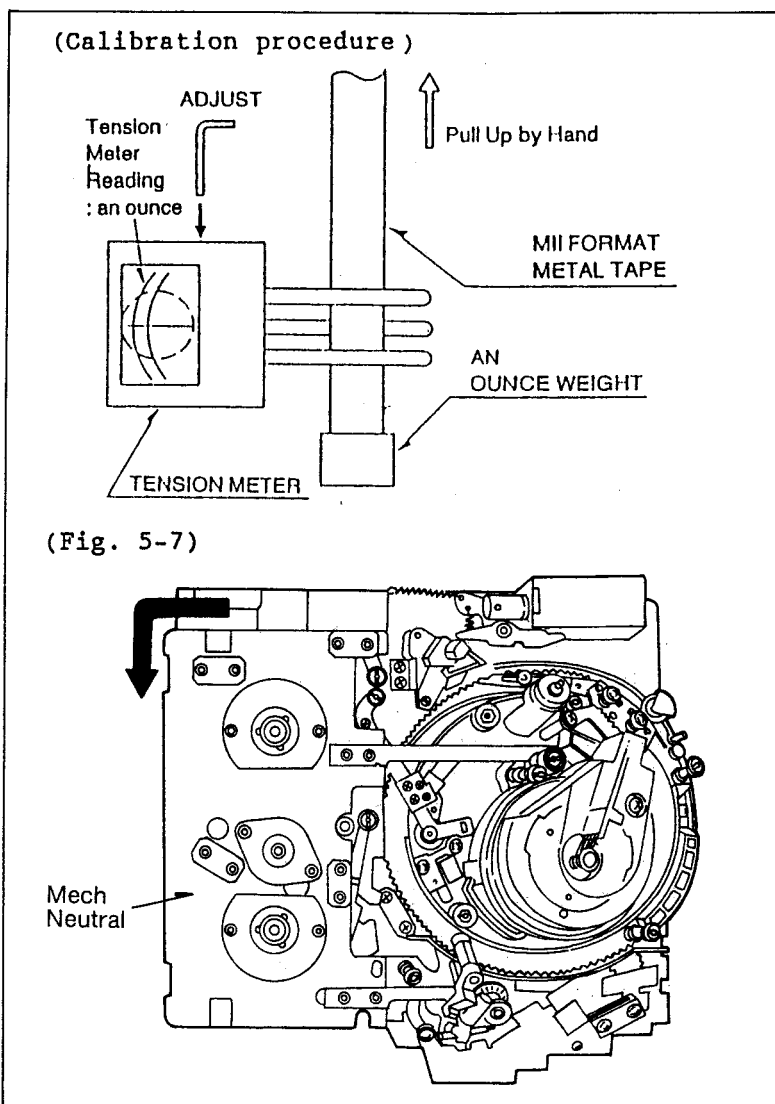
TENSION ADJUSTMENT (MECHANICAL)

1. Remove the front loading unit and connect the dummy plug (1) into P406 socket.
2. Extend the servo board and turn power on.
3. Place the unit in the EJECT mode and connect a digital voltmeter to TP82. Adjust VR41 (TENSION SENSOR AMP) for 2.5 +/- 0.002 (V/DC). Connect the digital voltmeter to TP83, and adjust VR42 (TENSION SENSOR AMP) for 2.5 +/- 0.002 (V/DC).
4. Set the mechanical neutral adjustment plate over the reel tables and fix the plate as shown in figure 5-7.

Note :

Vs : Supply Reel Sensor Voltage
Vt : Take-up Reel Sensor Voltage

5. Place the unit in the STOP mode. After loading is completed make sure that the P2 post touches the arm of the mechanical neutral adjustment plate as shown in figure 5-8.

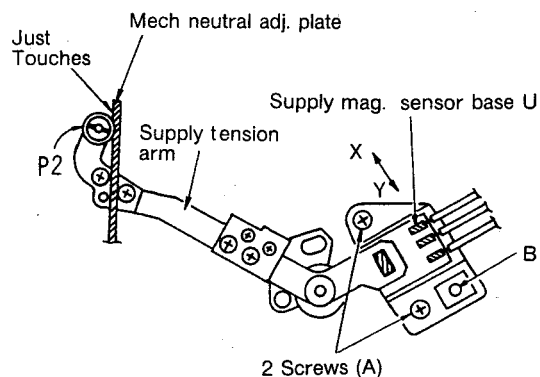


6. Measure the voltage at TP82 and TP83, and verify that it is the same as V_s and V_t measured in step 3.
7. If it is not, loosen the 2 screws (A) and insert the eccentric screwdriver into hole (B) and adjust the supply magnet sensor base unit, until the voltage at TP82 equals V_s ($\pm 0.005V$), TP83 equals V_t ($\pm 0.005V$) (figure 5-8, 5-9).
8. Tighten the 2 screws (A) (make sure the voltage at TP82 and TP83 does not change) and remove the mechanical neutral adjustment plate.
9. After this adjustment, confirm that the voltage at TP82 will change by more than 100mV, as the P2 post is moved by hand.
10. Connect the jumper wires between TP86, TP88 and TP85 to defeat the tape slack.
11. Connect the digital voltmeter to TP78.
12. Place the unit in the PLAY mode and adjust VR29 so that the voltage at TP78 is the same as V_s ($\pm 0.002V$) as measured in step 3.
13. Place the unit in the SHTL X1, SHTL X-1 mode and adjust VR33, VR28 and VR27 so that the voltage at TP78, TP79 is follows.

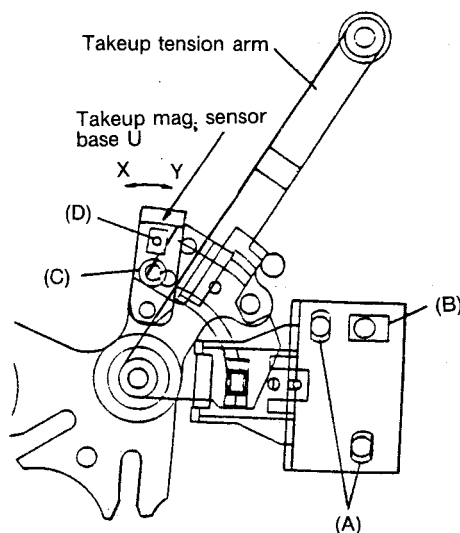
SHTL X1 mode TP78 $V_s \pm 0.002(V)$ (VR33)
 TP79 $V_t \pm 0.002(V)$ (VR28)
 SHTL X-1 mode TP79 $V_t \pm 0.002(V)$ (VR27)

14. Place the cassette over the reel tables and place the weight on the cassette to hold it in place. (full roll of solder)
15. Remove the jumper wires between TP86, TP88 and TP85.
16. Place the unit in the PLAY mode from tape beginning (MPL60 or 90 should be used) and confirm that the tape tension between P1 and P2 post is 23 grams ($\pm 2/-3$ grams) as shown in figure 5-10. (Tape tension confirmation should be done after the tape movement has stabilized.)
17. If the tension meter reading is not 23 grams ($\pm 2/-3$ grams), loosen screw (A), and insert the eccentric screwdriver into hole (B) and adjust the tension as shown in figure 5-11.
18. Tighten screw (A).
19. Confirm that the tape tension between P9 and P10 post is 23 ($\pm 2/-3$ grams) as shown in figure 5-12.

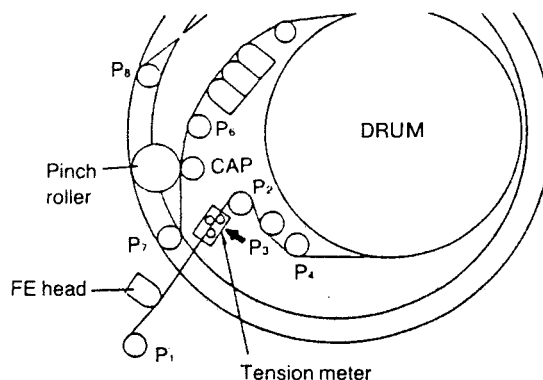
(Fig. 5-8)



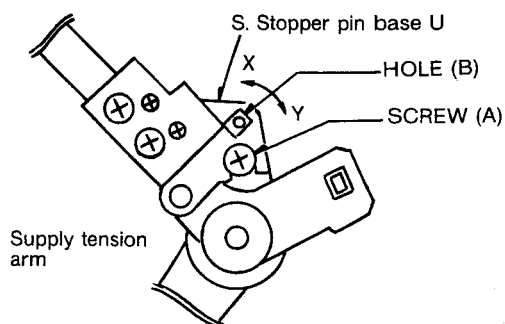
(Fig. 5-9)



(Fig. 5-10)



(Fig. 5-11)

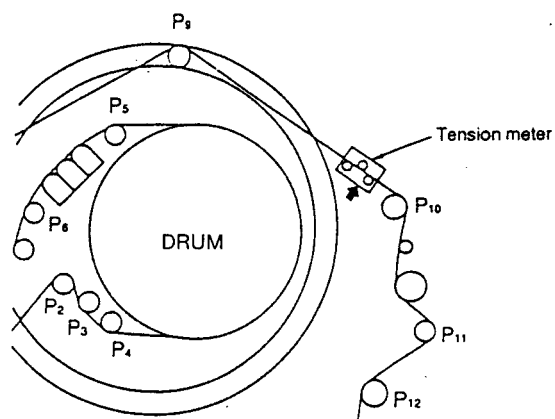


20. If the tension meter reading is not 23 (+2/-3 grams), loosen the screw (C) and insert the eccentric screwdriver into hole (D) as shown in figure 5-9.
21. Adjust the take up tension to 23 (+2/-3 grams) between P9 and P10.
22. Tighten screw (D).
23. Play back the work cassette from its beginning and adjust VR39 for 0.28V (+/-0.002V) at TP94.
24. Connect the jumper wires between TP97 and TP79.
25. Place the unit in the SLOW (X1) mode and adjust VR40 so that the take up tension is 15 grams (+/-2 grams) as shown in figure 5-12.
26. Remove the jumper wires.
27. Place the unit in the FAST FORWARD mode from tape beginning (MPL90 should be used) and adjust VR32 so that the supply side tension is 18 grams (+/-4 grams) between P1 and P2 post.
28. Place the unit in the REWIND mode from tape ending (MPL90 should be used) and adjust VR25 so that the take up side tension is 20 grams +/- 4 grams) between P9 and P10 post. (between P1 and P2 : 45 +/-5 grams.)

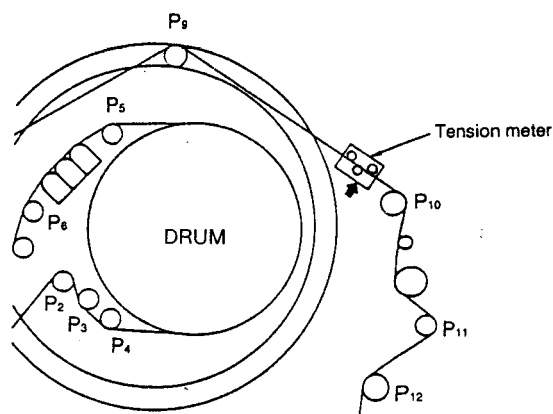
Note :

When the take up side tension is adjusted in the REWIND mode, the tension meter is turned around as shown in figure 5-13.

(Fig. 5-12)



(Fig. 5-13)



29. Confirm the Timer Roller phase in the FAST FORWARD mode. (Refer to Timer Roller Position Adjustment)
30. Connect the jumper wire between TP85, TP86 and TP88 and place the unit in the PLAY mode without the tape.
31. In order to measure the minimum sensor voltage, hold the supply tension arm by finger so that the spring plate just touches the supply tension arm pin.
32. Measure and record the voltage at TP84 (Vs).
33. In order to measure the minimum sensor voltage hold the Take up tension arm by finger so that the spring plate must touches the take up tension arm pin.
34. Measure and record the voltage at TP87(Vt).
35. Remove the jumper wires between TP88, TP86 and TP85.

36. Place the unit in the STOP mode without the tape.
37. In the STOP mode, adjust VR36, VR37 so that the TP86, TP88 is follows.

TP86 (Vs-1) +0.5/-0 (V) (VR36)
TP88 (Vt-1) +0.5/-0 (V) (VR37)

Note :

If the (Vs-1) or (Vt-1) is less than 5V, Vs or Vt should be adjusted for (Vs-0.3) or (Vt-0.3) (V).

6. CAPSTAN MOTOR REPLACEMENT AND ADJUSTMENT

REPLACEMENT

1. Remove the bottom cover and remove the capstan drive and power regulator board.
2. Disconnect connectors (A) (B) (C) and (D).
3. From the top side, remove the 2 screws (E) and remove the full erase head unit.
4. Remove the screw (G), loosen the screw (H) and move the stopper lever (I) in the direction of the arrow.
5. Remove the 3 screws (J) from the top side and remove the capstan motor from the bottom.

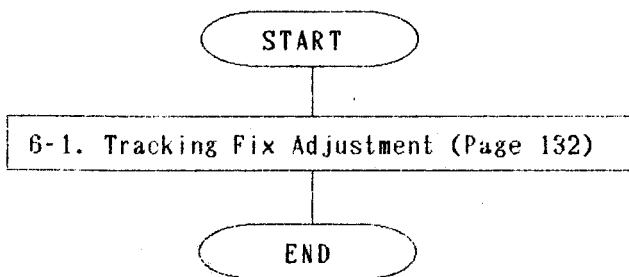
INSTALLATION

1. Reverse the previous steps.

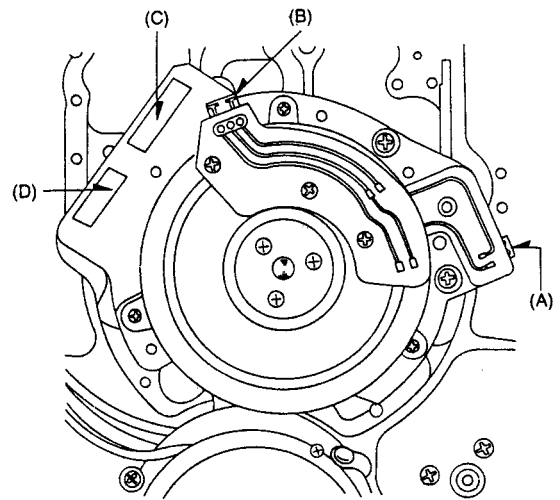
ADJUSTMENT

1. Make checkings and adjustments according to the following flow chart.

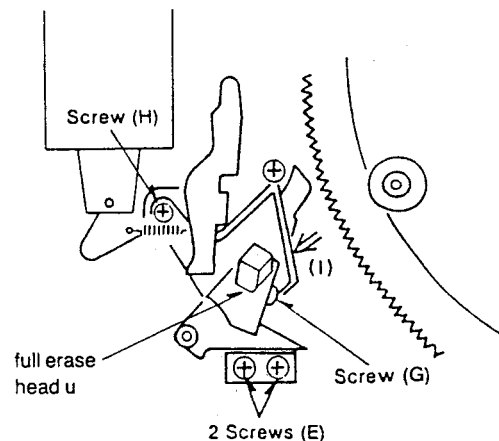
Flow Chart



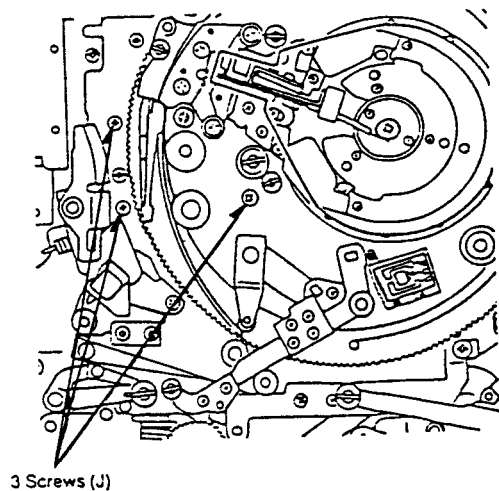
(Fig. 6-1)



(Fig. 6-2)



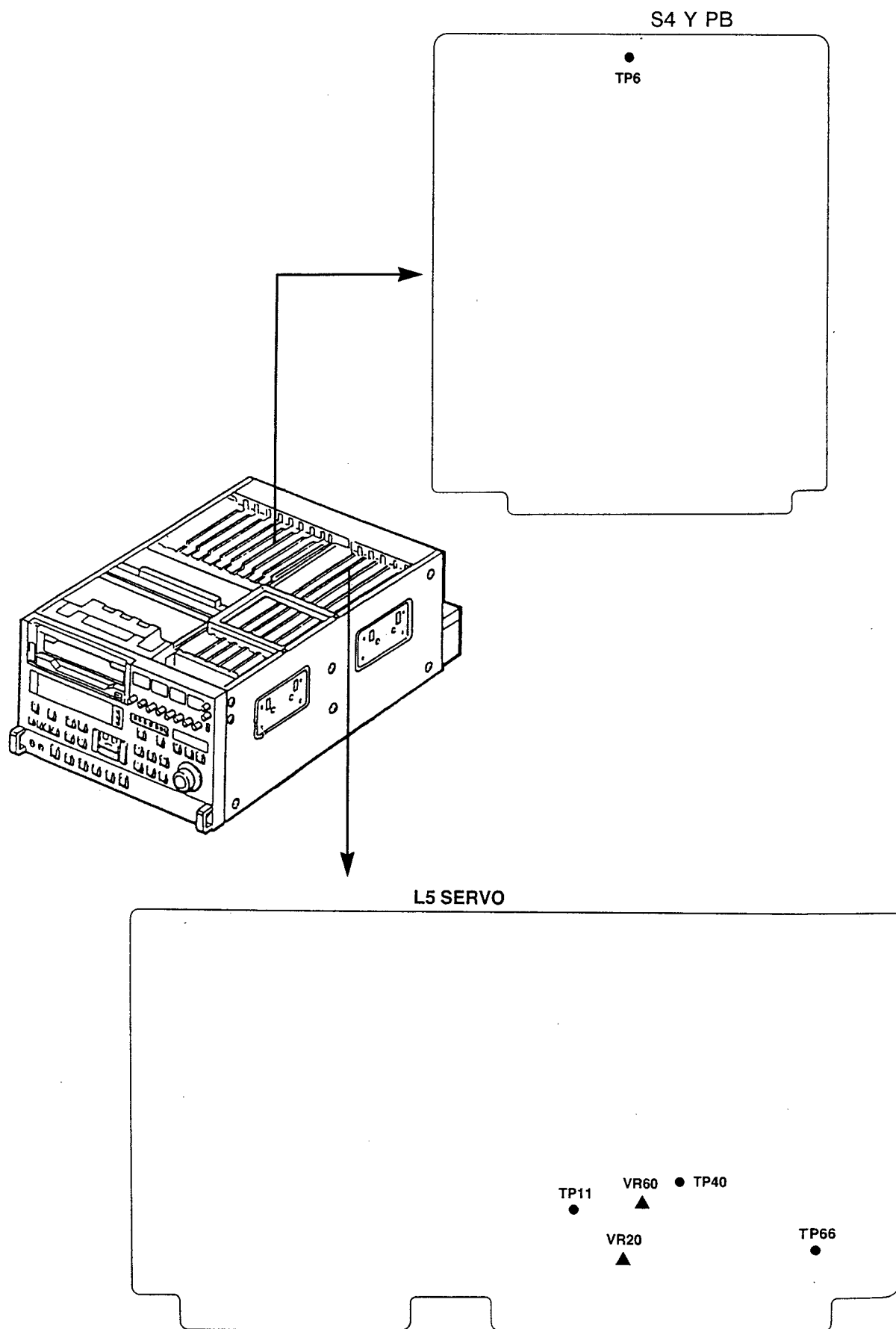
(Fig. 6-3)



6-1. TRACKING FIX ADJ.

(L5 SERVO)

TEST POINT	MODE	TAPE USED	M.EQ.	INPUT SIGNAL	ADJUSTMENT
TP6 (S4) TP11 TP40 TP66	RECORD ↓ PLAY	<div> <div>■</div> BLANK <div>□</div> ALIGNMENT </div>	OSCILLOSCOPE	COMPOSITE COLOUR BAR	VR20 (TR FIX) VR60 (AT TR FIX)
Step 1. MACHINE CONDITION			HEAD SELECT : R/P TRACKING VR : CENTRE		
Step 2. Adjust VR20 (TR FIX) so that the RF envelope is maximum (V1 and V2 levels) as shown.			<div> <div>⊗ VR20</div> <div>TP6 (Y PB)</div> <div>TP66</div> <div>V1 : MAX V2 : MAX</div> </div>		
Step 3. MACHINE CONDITION			HEAD SELECT : PLAY		
Step 4. Set the width of TP40 to 6 frames by un-calibration of scope and adjust VR60 (AT TR FIX) so that the T portion is 2 frames as shown.			<div>TP40</div> <div>TP11 (R/P HEAD)</div> <div>⊗ VR60 (PLAY HEAD)</div> <div>6 Frame</div> <div>0 ± 100 μsec.</div> <div>2 Frame</div> <div>T</div>		



7. REEL MOTOR REPLACEMENT AND ADJUSTMENT

REPLACEMENT

Tool : Hex Wrench (VFK0326)

REMOVAL

1. Remove the front loading unit.
2. Turn the small cassette loading motor by hand until the sub-loading gear is disengaged from the small reel table as shown in figure 7-1.

Note:

When the Intermediate Gear is removed, the small cassette holder base and take-up reel might be caught the Intermediate Gear.

3. Remove the E-ring and remove the intermediate gear.
4. Loosen the 2 hex screws (A) and remove the supply and take-up reel tables and the 2 springs. (Be sure not to lose these springs)
5. Remove the bottom panel of the unit, capstan drive and power regulator board.
6. Disconnect the connectors (B) and (C).
7. Remove the 6 screws (D) and remove the reel motors as shown in figure 7-3.

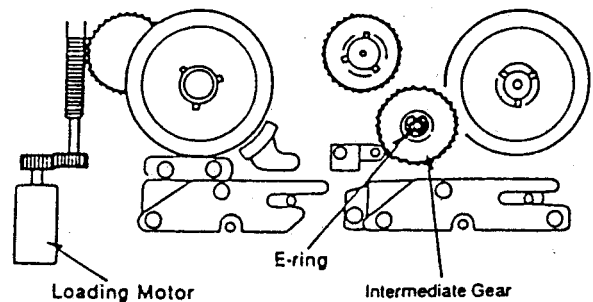
INSTALLATION

1. Follow the removal steps in reverse order.
2. Insert the reel table all the way in and fasten the hex screws (A) temporarily.
3. Perform the following adjustments. (next page)

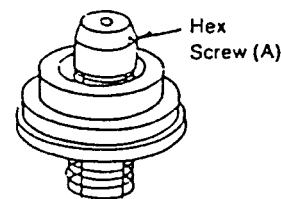
Note :

Hex screw is tighten at the D-cut portion of Reel shaft. (Fig. 7-4)

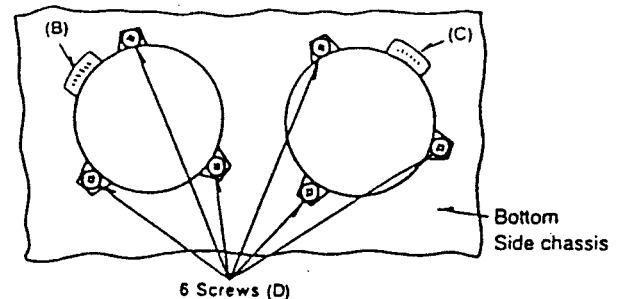
(Fig. 7-1)



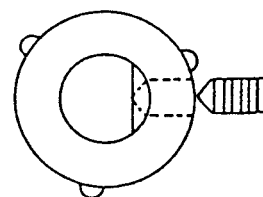
(Fig. 7-2)



(Fig. 7-3)



(Fig. 7-4)



ADJUSTMENT

Tools Required :

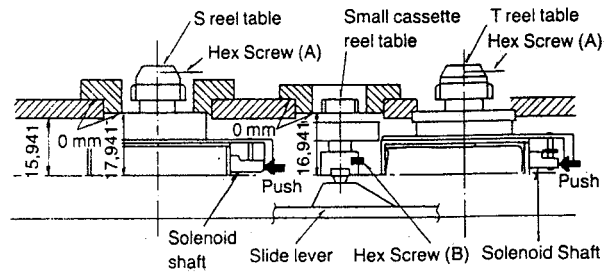
Mechanical Neutral Adjustment
Plate (VFK0352)

Hex Wrench (1.5mm)

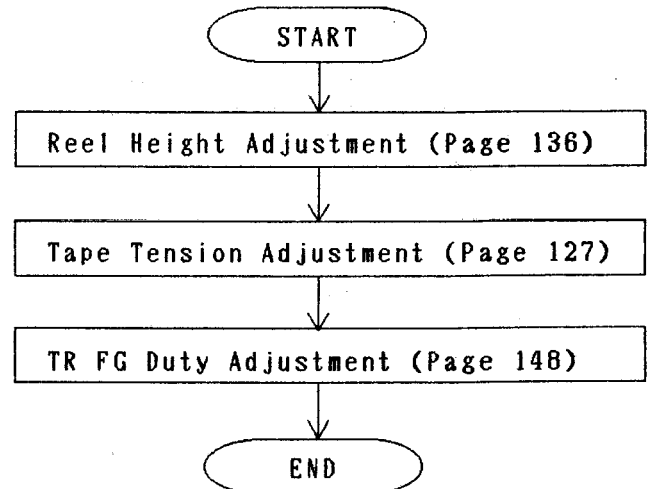
Mode : Unloading

1. Loosen the 2 Hex screws (A). Place the Mechanical Adjustment plate on the reel tables while releasing main brake by pushing the brake solenoid shaft by hand.
2. Tighten the hex screws (A) securely. (Height of the reel table is automatically set by spring action.)
3. Make electrical checkings and adjustments according to the flow chart on right side.

(Fig. 7-5)



Flow Chart



8. LOADING MOTOR REPLACEMENT

REMOVAL

1. Remove the bottom plate.
2. Disconnect the connector P439 on the Mechanical Intermediate (1) P.C.Board.
3. Remove the 3 screws (A) and remove the turn roller lifter unit (B) as shown in figure 8-1.
4. Remove the 3 screws (C) and remove the sub loading switch (Fig. 8-1).
5. Remove the 4 screws (E), motor holder cover (G) and the loading motor unit (F). (Fig. 8-2)
6. Remove the loading belt (H). (Fig. 8-2)
7. Remove the hex screw (I) and remove the motor pulley (J). (Fig. 8-2)
8. Remove the screw (K) and remove the loading motor. (Fig. 8-2)

INSTALLATION

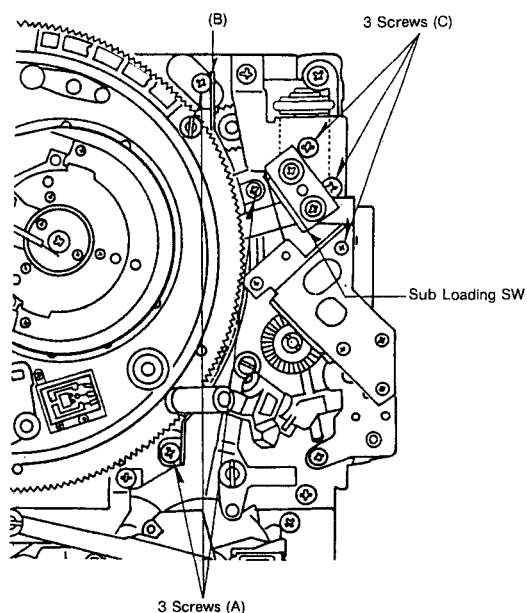
1. Follow the removal steps in reverse order

Note :

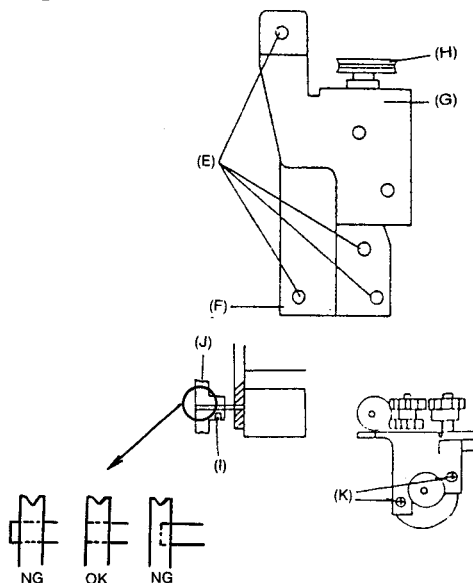
When install the motor Holder Cover, perform following procedure.

1. Slightly tighten the screw (A), (B), (C) and fasten screw (D). (Fig. 8-3)
2. Attach a flat blade screwdriver and push in the arrow direction as shown in figure 8-3.
3. Tighten screw (A), (B) and (C).
4. After installing the loading motor, sub loading switch adjustment must be performed.

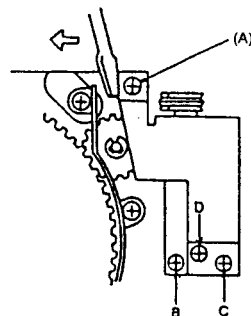
(Fig. 8-1)



(Fig. 8-2)



(Fig. 8-3)



9. SMALL CASSETTE LOADING MOTOR REPLACEMENT

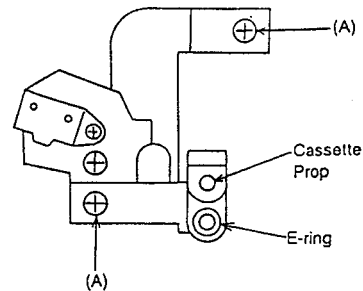
REMOVAL

1. Remove the front loading unit.
2. Loosen the hex screw and remove the supply reel table.
3. Unscrew the 2 screws (A) and remove the Detector Base (L) unit. (Fig. 9-1)
4. Unscrew the 2 screws (B) and remove the loading motor unit in direction as shown in figure 9-2.
5. Unsolder the 2 wires on the loading motor.
6. Unscrew the 2 screws (C) and remove the loading motor as shown in figure 9-3.

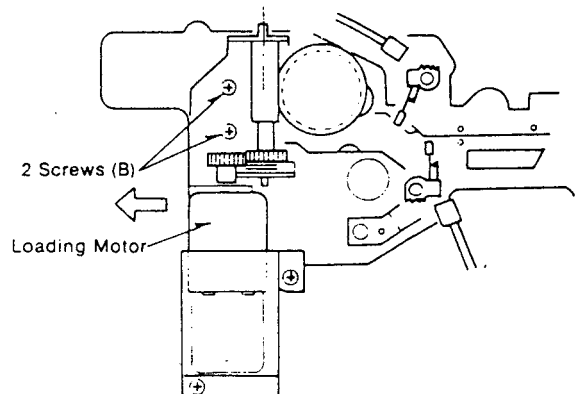
INSTALLATION

1. Install the new loading motor and set the triangular mark of loading motor to the upper side (away from the main bracket).
2. Tighten the 2 screws (C) and follow the removal instructions in reverse order.

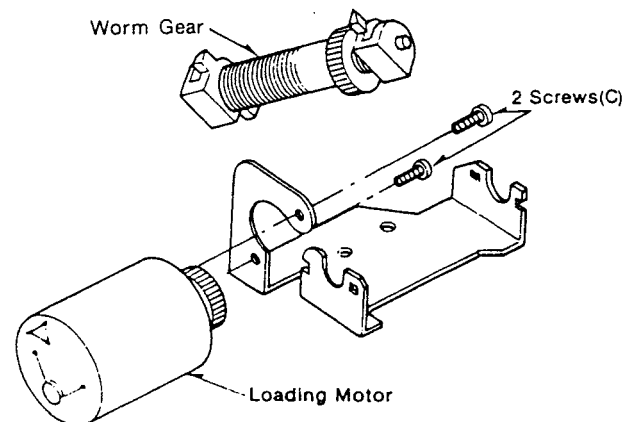
(Fig. 9-1)



(Fig. 9-2)



(Fig. 9-3)



10. PINCH ROLLER SOLENOID REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Remove the 3 screws (A) and disconnect the connector (P405) on the Mechanical Intermediate (2) P.C.Board. (Fig. 10-1)
2. Remove the pinch solenoid.

INSTALLATION

1. Follow the removal steps in reverse order.

ADJUSTMENT

Tool Required :

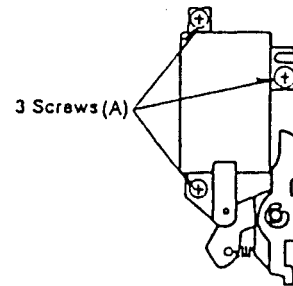
Eccentric Screwdriver (VFK0358)

Fan Type Tension Gauge (VFK66)

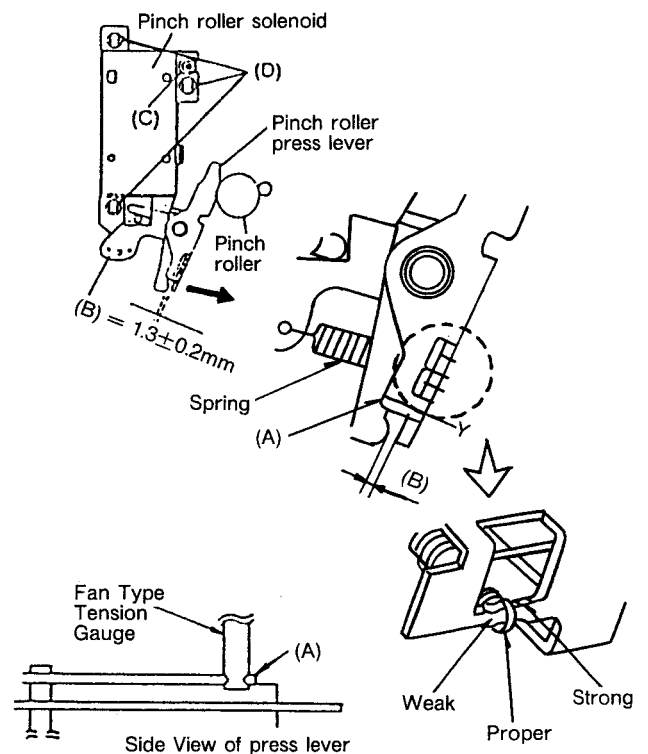
Specification : $1.3\text{mm} \pm 0.2\text{mm}$.

1. Play back a tape and measure the clearance (B) as indicated in figure 10-2. Verify that it is $1.3\text{mm} \pm 0.2\text{mm}$.
2. If not, loosen the 3 screws (D) (figure 10-2) and insert the eccentric screwdriver into hole (C).
3. Adjust the Pinch roller solenoid position with the eccentric screwdriver so that the clearance (B) is $1.3\text{mm} (\pm 0.2\text{mm})$.
4. Tighten the 3 screws (D).
5. Insert a work cassette and play back the tape.
6. Insert a 1.2mm thickness gauge to clearance (B).
7. Place the fan type tension gauge so that its tip contacts the position (A) as shown in figure 10-2.
8. Push the tension gauge in the direction indicated by arrow Y in figure 10-2.
9. Confirm that the placed thickness gauge drop when the tension gauge reading is 1900 ± 100 grams.
10. If this condition is not met, then change the position of the spring as indicated in figure 10-2.

(Fig. 10-1)



(Fig. 10-2)



11. PINCH PRESS LEVER REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Remove the pinch solenoid (refer to pinch solenoid replacement section).
2. Remove the spring as shown in figure 11-1.
3. Remove the E-ring and washer as shown in figure 11-1.
4. Remove the Pinch Press Lever.

INSTALLATION

1. Install the new Pinch Press Lever and follow the removal steps in reverse order.

ADJUSTMENT

Tool Required :

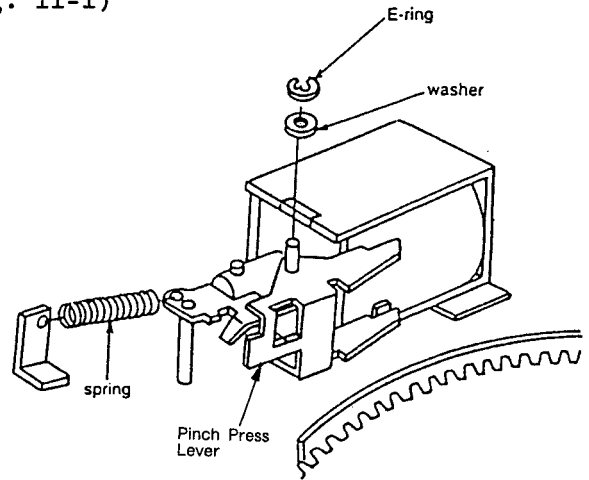
Eccentric Screwdriver (VFK0358)

Fan Type Tension Gauge (VFK66)

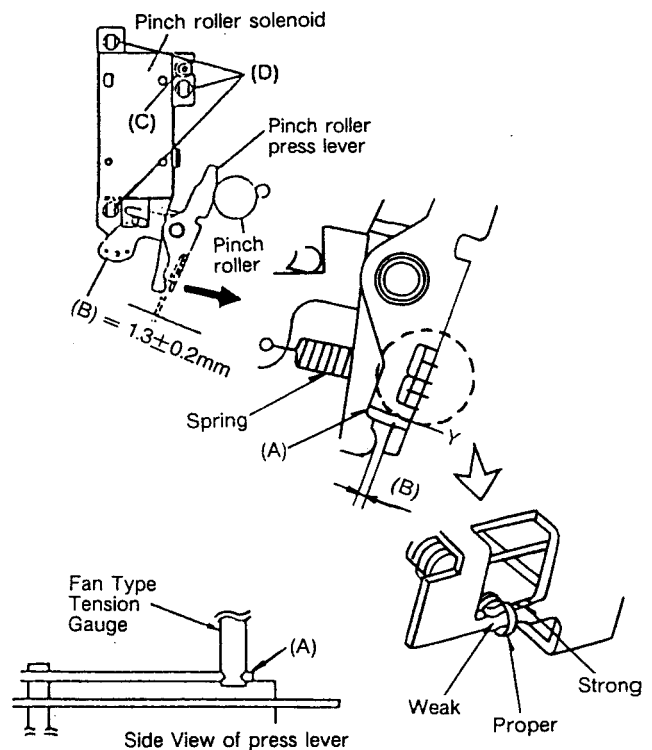
Specification : $1.3\text{mm} \pm 0.2\text{mm}$.

1. Play back a tape and measure the clearance (B) as indicated in figure 11-2. Verify that it is $1.3\text{mm} \pm 0.2\text{mm}$.
2. If not, loosen the 3 screws (D) (figure 11-2) and insert the eccentric screwdriver into hole (C).
3. Adjust the Pinch roller solenoid position with the eccentric screwdriver so that the clearance (B) is $1.3\text{mm} (\pm 0.2\text{mm})$.
4. Tighten the 3 screws (D).
5. Insert a work cassette and play back the tape.
6. Insert a 1.2mm thickness gauge to clearance (B).
7. Place the fan type tension gauge so that its tip contacts the position (A) as shown in figure 11-2.
8. Push the tension gauge in the direction indicated by arrow Y in figure 11-2.
9. Confirm that the placed thickness gauge drop when the tension gauge reading is 1900 ± 100 grams.
10. If this condition is not met, then change the position of the spring as indicated in figure 11-2.

(Fig. 11-1)



(Fig. 11-2)



12. BRAKE SOLENOID REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Remove the bottom plate.
2. Disconnect connectors P428 and P429 on the Mechanical Intermediate (2) P.C.Board.
3. Unscrew the 11 screws and remove the left side panel as shown in figure 12-1.
4. Unscrew the 5 screws (C) on the left side and unscrew the 2 screws (D) on the front sub panel and then remove the front sub panel toward as shown in figure 12-2.
5. Remove the 4 screws (A) and remove the supply and take up brake cover plates. (Fig. 12-3)
6. Remove the supply and take up solenoids.

INSTALLATION

1. Follow the removal steps in reverse order.

ADJUSTMENT

Tools Required

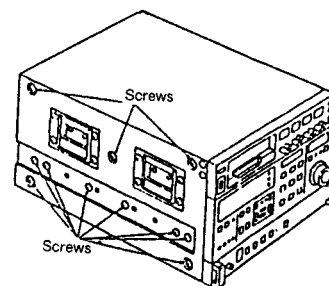
Eccentric Screwdriver (VFK0358) (VFK0359)

1. While moving the spring pin in each brake solenoid plunger in directions E and F, (figure 12-4) observe the clearance (A) and (B) between each brake pad and it's turntable. This clearance should be between 0.5 and 1.5mm.
2. If not, loosen the 2 screws (D) and insert the eccentric screwdriver into hole (C).
3. Adjust the position of the main brake so that the clearance (A) and (B) is within specifications. (figure 12-4)
4. Observe the clearance (A) as shown in (figure 12-5) and make sure that it is within 0.8 to 1.2mm.
5. If not, loosen the two screws (C) and insert the eccentric screwdriver into hole (B). Adjust the brake stopper so that clearance (A) is within specifications. (figure 12-5)
6. Tighten the two screws (C).

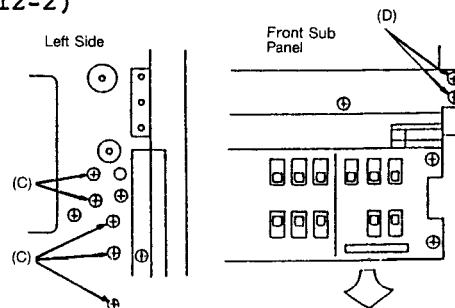
Note:

After this adjustment, rotate the take up reel counterclockwise, and the supply reel clockwise and verify that the clearance (H) is 0.3 to 0.7mm as shown in figure 12-5. (While brake is engaged).

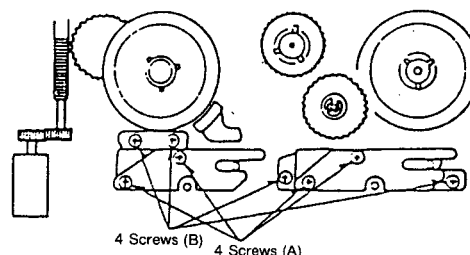
(Fig. 12-1)



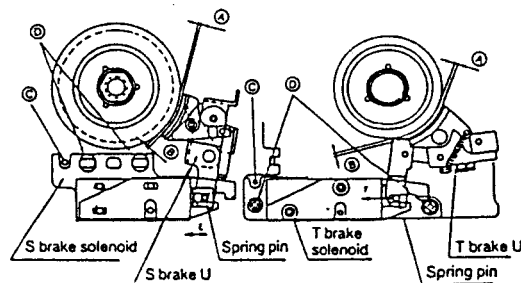
(Fig. 12-2)



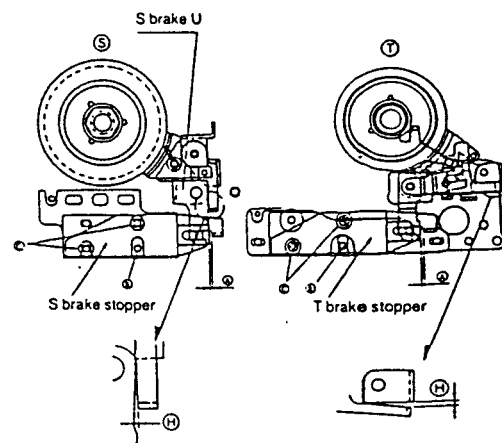
(Fig. 12-3)



(Fig. 12-4)



(Fig. 12-5)



13. TIMER ROLLER ENCODER UNIT (with bearing) REPLACEMENT AND ADJUSTMENT

REPLACEMENT

Tools Required :
Post Driver (VFK0293)

1. Remove the front loading unit.
2. Remove the 2 screws (C) and remove the timer roller encoder P.C.Board (B) in the arrow direction as shown in figure 13-1.
3. Remove the flange (A), bearing (F), collar (G) and remove the timer roller unit. (Fig. 13-2) (Be sure not to lose the spring. Do not loosen the hex screw) When remove the bearing (F), use tweezers to remove the bearing.

CAUTION :

Please be careful with this part, timing disk is positioned into TR Encoder. (Fig. 13-3)

INSTALLATION

1. Insert the bearing before installing the TR Encoder unit.
2. Install the TR Encoder unit, after that insert the collar and bearing to the TR Encoder unit.
3. Tighten flange (A). (Do not tighten the hex screw)
4. After the installation, perform the following adjustments.

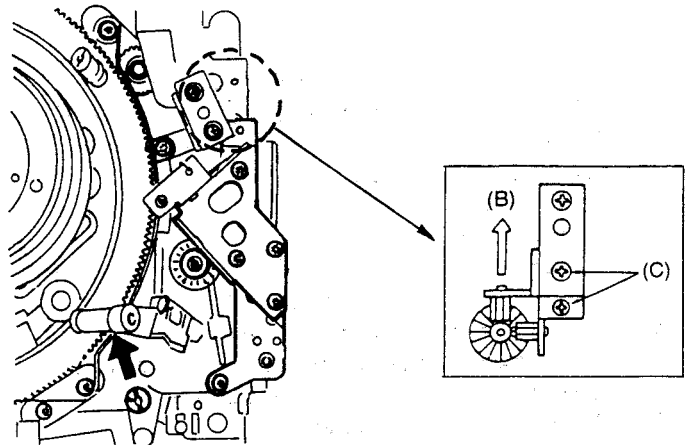
ADJUSTMENT

1). Timer Roller Height Adjustment

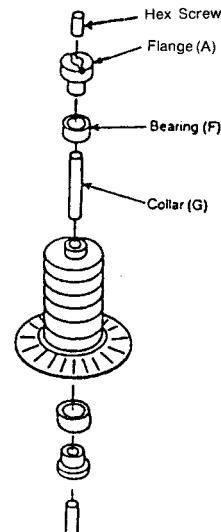
Tools Required :
Hex Wrench (VFK0326)

1. Play back the MPL90 tape to make sure the tape edges do not fall into the gutters on the timer roller in any mode.
2. If the above requirement is not satisfied, loosen Hex-Screw (D) and turn flange (E) for height adjustment.
3. Finally, be sure to tighten up Hex-Screw (D).

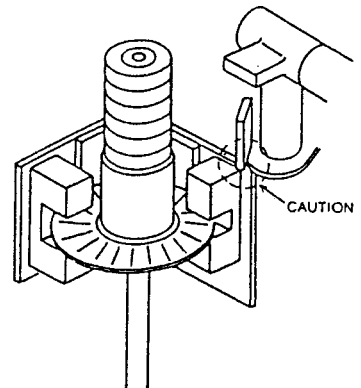
(Fig. 13-1)



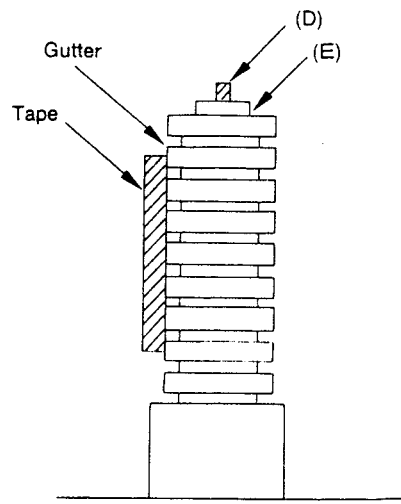
(Fig. 13-2)



(Fig. 13-3)



(Fig. 13-4)



2). Timer Roller Position Adjustment

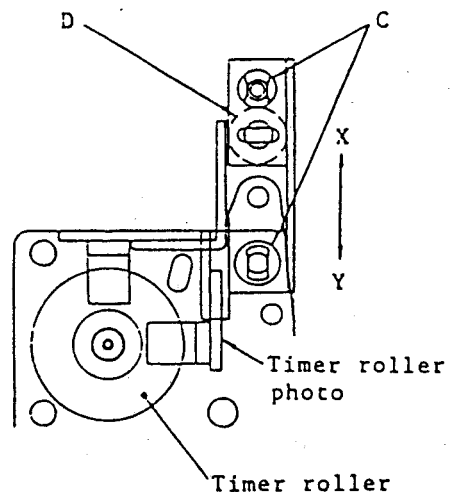
Tools Required :

Eccentric Screwdriver (VFK0358)

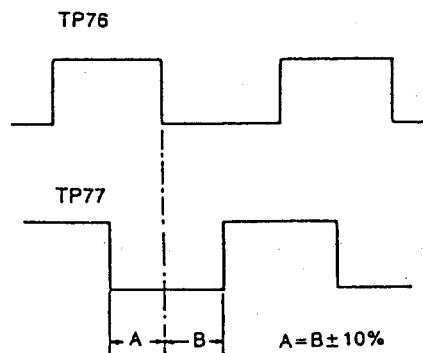
Dual Channel Oscilloscope

1. Connect the scope CH1 to TP76 and CH2 to TP77 on the servo P.C.Board.
2. Insert a cassette and place the unit in the PLAY mode.
3. Loosen the 2 screws (C), as shown in figure 13-5.
4. Insert the eccentric screwdriver into hole (D) (figure 13-5).
5. Turn the eccentric screwdriver until the two waveforms are 90 degrees apart $A=B$ as shown in figure 13-6.
6. Tighten the 2 screws (C).

(Fig. 13-5)



(Fig. 13-6)



14. SUB LOADING SWITCH REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Unscrew the 2 screws (C) and remove the Sub Loading Switch (Micro SW) with Sub Loading adjustment plate as shown in figure 14-1.
2. Unsolder the 2 wires (E) on the Sub Loading Switch (Micro SW) as shown in figure 14-1.
3. Unscrew the 2 screws (F) and remove the Sub Loading Switch (Micro SW) from Sub Loading Adjustment Plate as shown in figure 14-2.

INSTALLATION

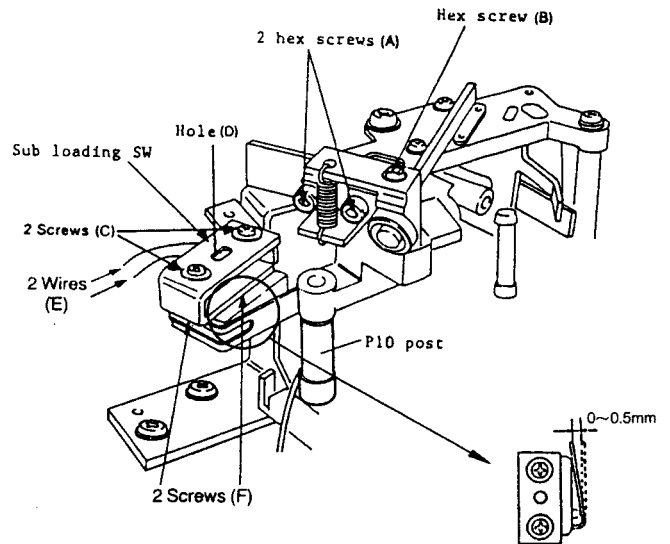
1. Install the new Sub Loading Switch (Micro SW) and follow the removal step in reverse order.

ADJUSTMENT

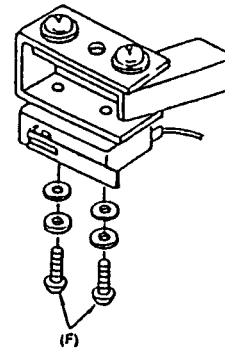
Tools Required :
Eccentric Screwdriver (VFK0358)

1. Turn Power on. Insert a cassette and wait until tape loading is completed.
2. Make sure that when the tape loading is completed, that the sub loading switch has activated. (Check that Load speed increases after switch closes).
3. If the switch does not activate, loosen the 2 screws (C), insert the eccentric screwdriver into hole (D), and adjust the position of the switch as needed. (figure 14-1)

(Fig. 14-1)



(Fig. 14-2)



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15. LEAF SWITCH REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Remove the front loading unit.
2. Remove the supply reel table as shown in figure 15-2.
3. Unsolder the wire (A) on the leaf switch.
4. Unscrew the screws (B) and remove the leaf switch as shown in figure 15-1.

Note:

Both leaf switches use the same replacement procedure.

INSTALLATION

1. Install the new leaf switch and solder the wires. Cover the exposed ends with shrink tubing.
2. Follow the removal steps in reverse order.

ADJUSTMENT

Tools Required :

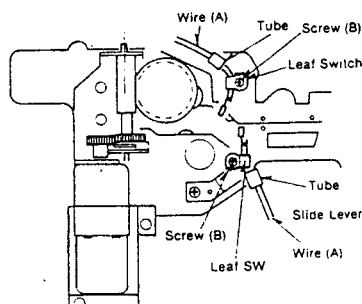
Fine Adjustment Screwdriver (VFK0446)

1. After remove the front loading unit reconnect the connector (P406) to the removed front loading unit. Insert a work small cassette to the removed front loading unit to load in small cassette mode.
2. Confirm that the projecting part 3 (figure 15-2) on the white plastic slide lever is in line with it's corresponding hole 2 as shown in figure 15-2.
3. If it is not, turn the power switch off and loosen the hex screw on the supply reel table, and remove the supply reel table. Loosen screws (B), and insert the fine adjustment screwdriver into hole (C).
4. Adjust the reel table up leaf switch position, by turning the fine adjustment screw driver power switch ON and confirm that the projecting part on the slide lever is lined up with the hole 2 as shown in figure 15-2.
5. If it is not. Repeat steps 3 and 4.
6. Place the unit in the large cassette mode by dummy plug switch.
7. Confirm that the position of the projecting part 3 on the slide lever is aligned with hole.
8. If not, power switch off and loosen screw (E), then insert the fine adjustment screwdriver into hole (F).
9. Adjust the leaf switch (down) until alignment of projecting part 3 and hole 1 is achieved as in steps 3 and 4.

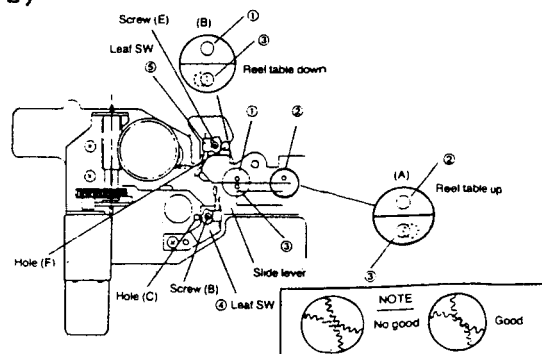
Note:

Confirm that the two gears (interlocking gear and small cassette reel gear) fit properly, when the small cassette reel table is raised. (see figure 15-2)

(Fig. 15-1)



(Fig. 15-2)



16. MAIN BRAKE REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Remove the front loading unit.
2. Remove the spring (B) using tweezers. (Fig. 16-1)
3. Remove the E-ring (K) and remove the main brake (C). (Fig. 16-1)

INSTALLATION

1. Perform steps 3 and 2 in that order.

ADJUSTMENT (BRAKE TORQUE ADJUSTMENT)

Tools Required :

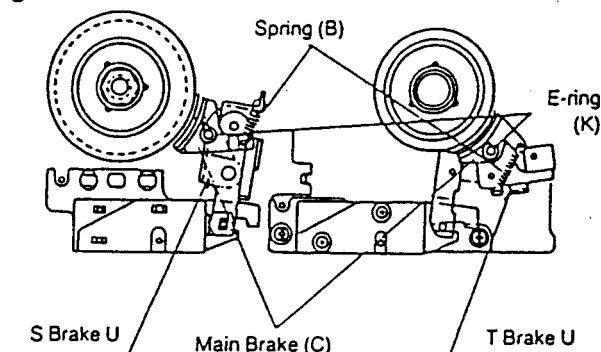
Dial Torque Gauge (VFK0133)

Dial Torque Gauge Adaptor (VFK0134)

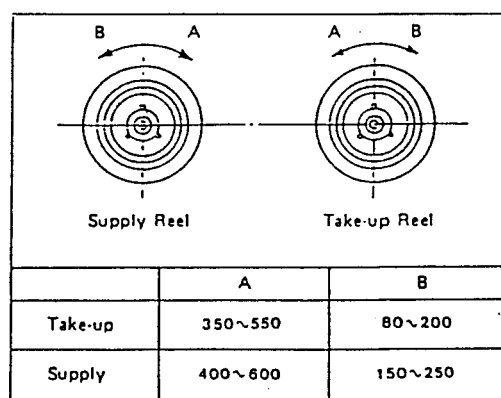
1. Confirm that the small cassette reel table is in the down position.
2. Attach the dial torque adaptor to the dial torque gauge.
3. Place the dial torque gauge over the reel table. In making this measurement the weight of the gauge should not rest on the reel table. (figure 16-3)
4. Float the gauge slightly above the flange of the reel table as shown in figure 16-3 and turn it in the direction as shown in figure 16-2. The gauge should be read at the point where it begins to slip.
5. If out of specification, take the following corrective steps. Supply side brake and Take-up side brake should replace the entire brake unit with a new one, as required.

CONDITION		Correspondence
S	If the specification is not as indicated in figure 16-2 on the A direction.	Change the position of the spring (C).
	If the specification is not as indicated in figure 16-2 on the B direction.	Replace the spring (D)
T	If the specification is not as indicated in figure 16-2 on the A direction.	Replace the spring (E),(F)
	If the specification is not as indicated in figure 16-2 on the B direction.	

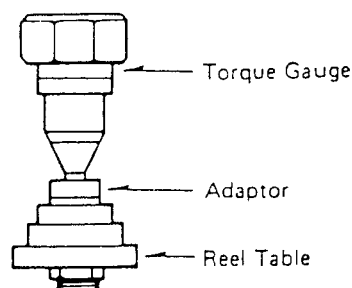
(Fig. 16-1)



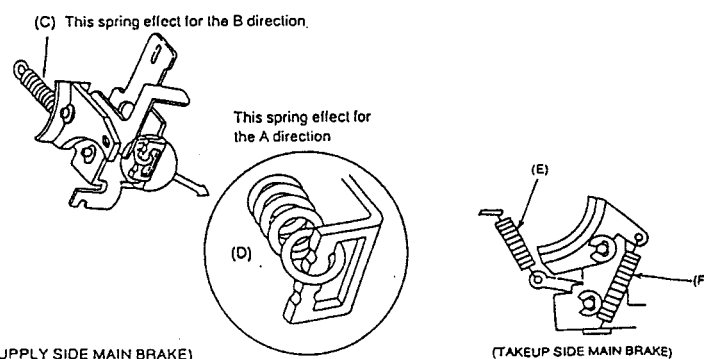
(Fig. 16-2)



(Fig. 16-3)



(Fig. 16-4)



17. PINCH ROLLER ARM UNIT REPLACEMENT

REMOVAL

1. Push the ring drive gear (A) by using a screw driver and move the loading ring CCW so that the Pinch Roller reaches the position as shown in figure 17-1.
2. Remove the E-ring (C) using the tweezers.
3. Remove the Pinch Roller Arm unit (B).

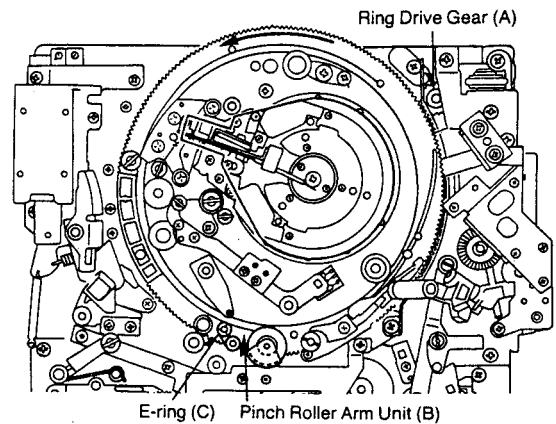
INSTALLATION

1. Install a new Pinch Roller Arm unit and attach the spring as originally installed. (refer to figure 17-2)
2. Turn the power on and insert a blank cassette. Playback the tape and observe the tape path. Check that no tape curling occurs at any post.

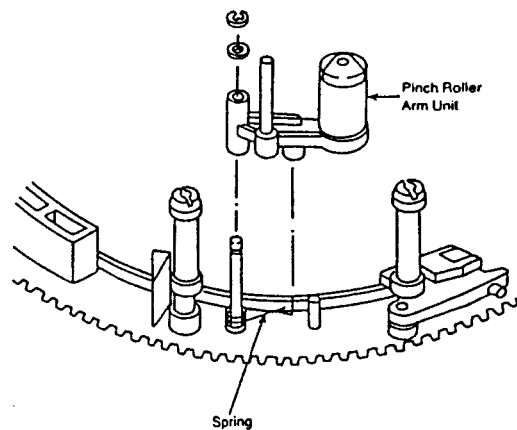
Note:

When replacing the pinch roller, be sure not to loose the washer.

(Fig. 17-1)



(Fig. 17-2)



18. FULL ERASE HEAD REPLACEMENT AND ADJUSTMENT

REMOVAL

1. Unsolder 2 leads on the erase head.
2. Remove the 2 screws (A) and remove the full erase head assembly. (Fig. 18-1)
3. Remove the screw (B) and remove the head. (Fig. 18-2)

Note:

Be sure not to lose the spacer (C)

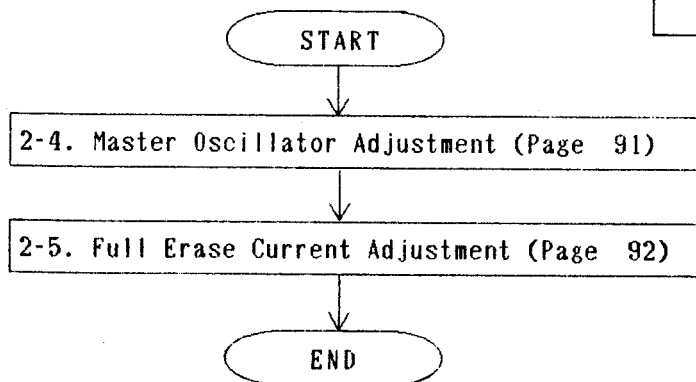
INSTALLATION

1. After installing the head, perform the following adjustments.

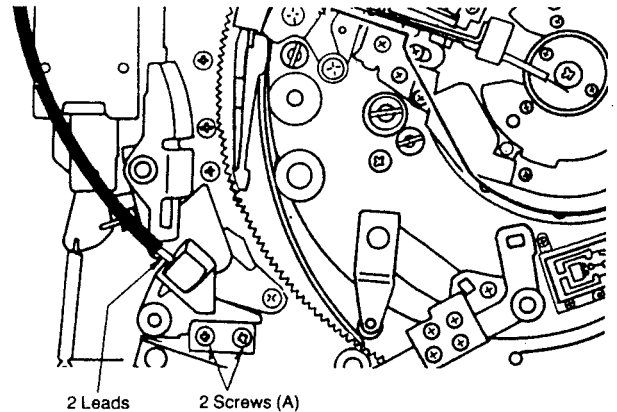
ADJUSTMENT

1. Make checkings and adjustments according to the following flow chart.

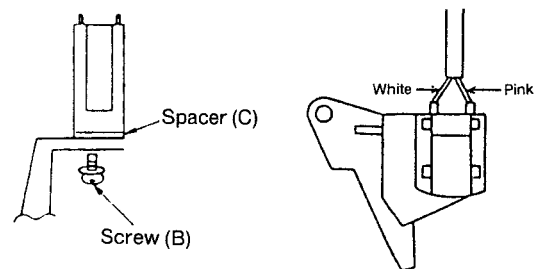
Flow Chart



(Fig. 18-1)



(Fig. 18-2)



19. LOADING MOTOR BELT REPLACEMENT

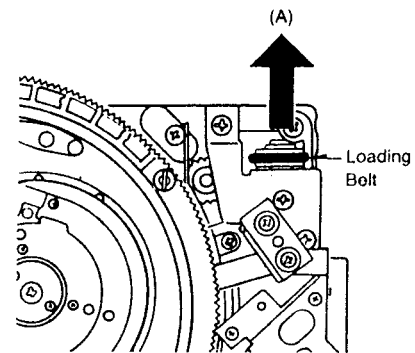
REMOVAL

1. Remove the loading belt to direction (A) as shown in figure 19-1.

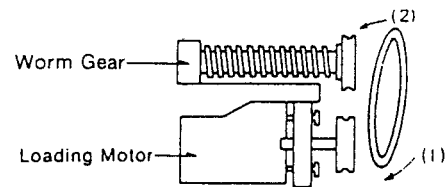
INSTALLATION

1. Put new loading belt onto the loading motor first as shown in figure 19-2.
2. Then put in onto the wormgear pulley as shown in figure 19-2.
3. Clean the belt after replacement.

(Fig. 19-1)



(Fig. 19-2)



20. INTERMEDIATE GEAR REPLACEMENT

REMOVAL

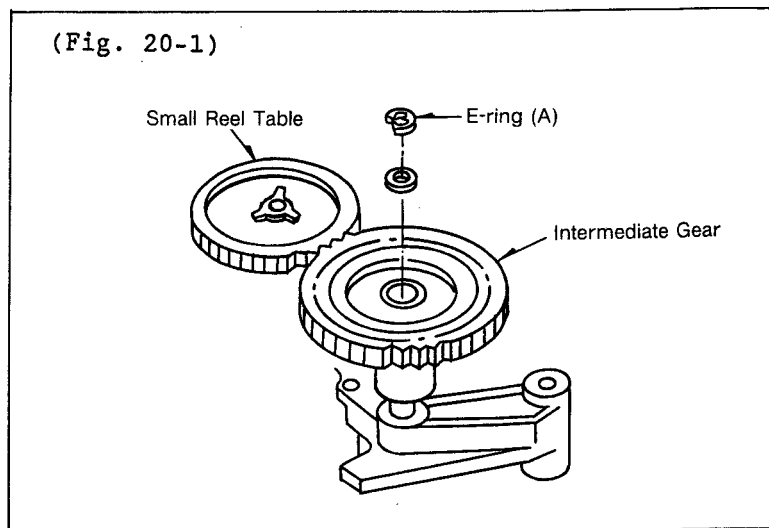
1. Remove the front loading unit.
2. Turn the loading motor for the small cassette by hand until the intermediate gear is disengaged from the small reel table as shown in figure 20-1.
3. Remove the E-ring (A) and remove the intermediate gear.

Note:

Be sure not to lose the washers.

INSTALLATION

1. Install the new intermediate gear and follow the removal steps in reverse order.



21. DETECTOR BASE UNIT REPLACEMENT

REMOVAL

(Previous Type)

1. Remove the front loading unit.
2. Remove the screws (A) and remove the Detector Base Unit. (Fig. 21-1)
3. Unsolder the 3 wires (B). (Fig. 21-1)

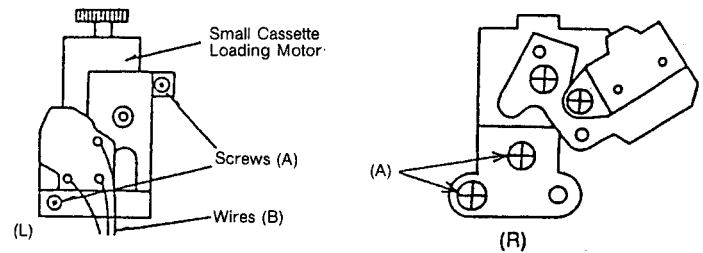
(Latest Type for left side)

1. Remove the 2 screws (A), remove the E-ring and cassette prop as shown in figure. (be sure not to lose the spring) (Fig. 21-2)

INSTALLATION

1. Install the new Detector base unit following removal steps in reverse order.
2. Confirm that both sizes of cassette are detected properly and that the correct reel tables actuate.

(Fig. 21-1)



(Fig. 21-2)

